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THE #1 MAGAZINE FOR HOME WOODWORKERS

APRIL 1991 • ISSUE NO. 42
Display until April 16

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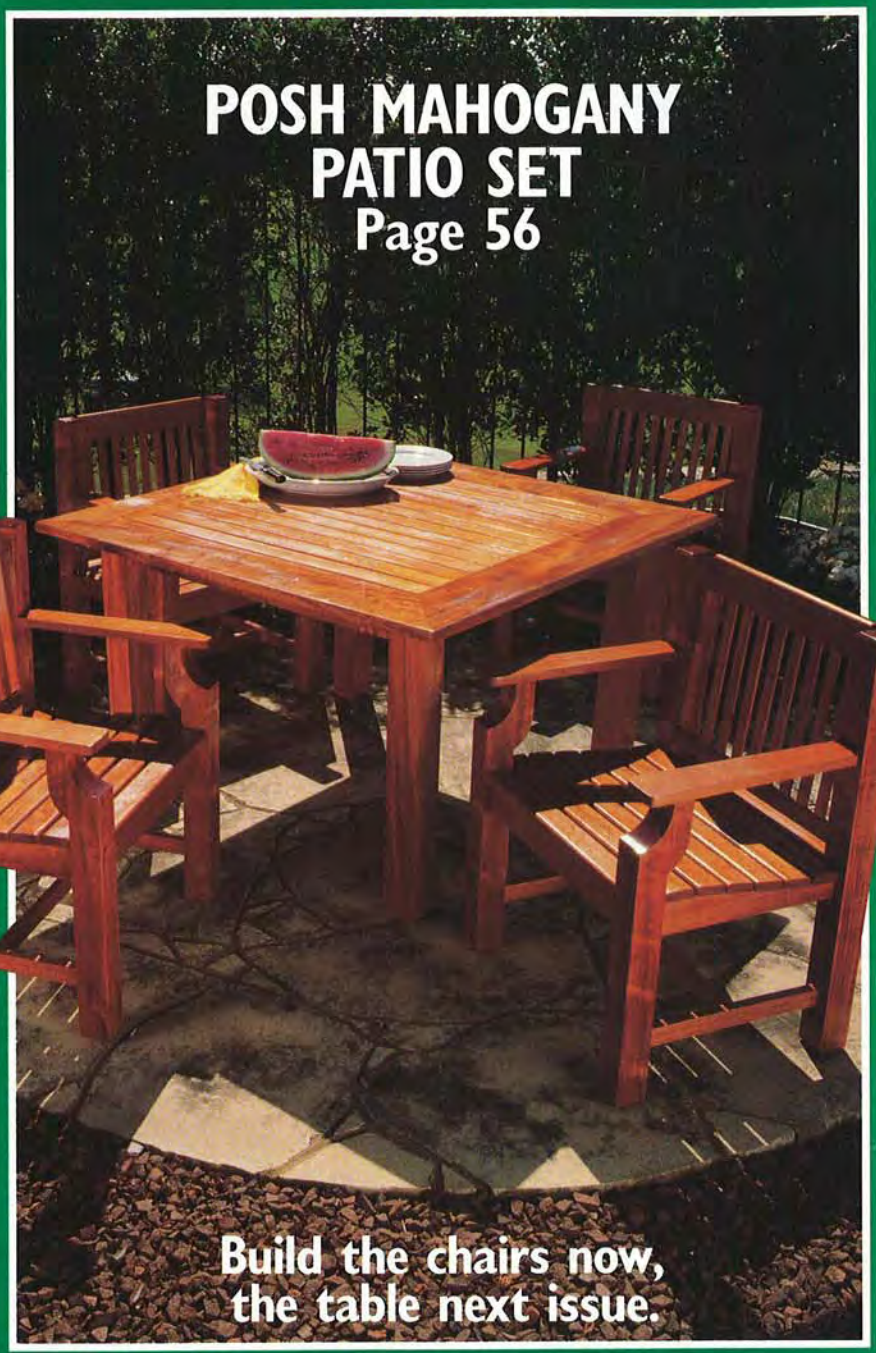
- Welcome sign
- Domed display case
- Wren birdhouse
- Marbleized clock
- Scrollsawed plaques



POSH MAHOGANY PATIO SET

Page 56

Build the chairs now, the table next issue.

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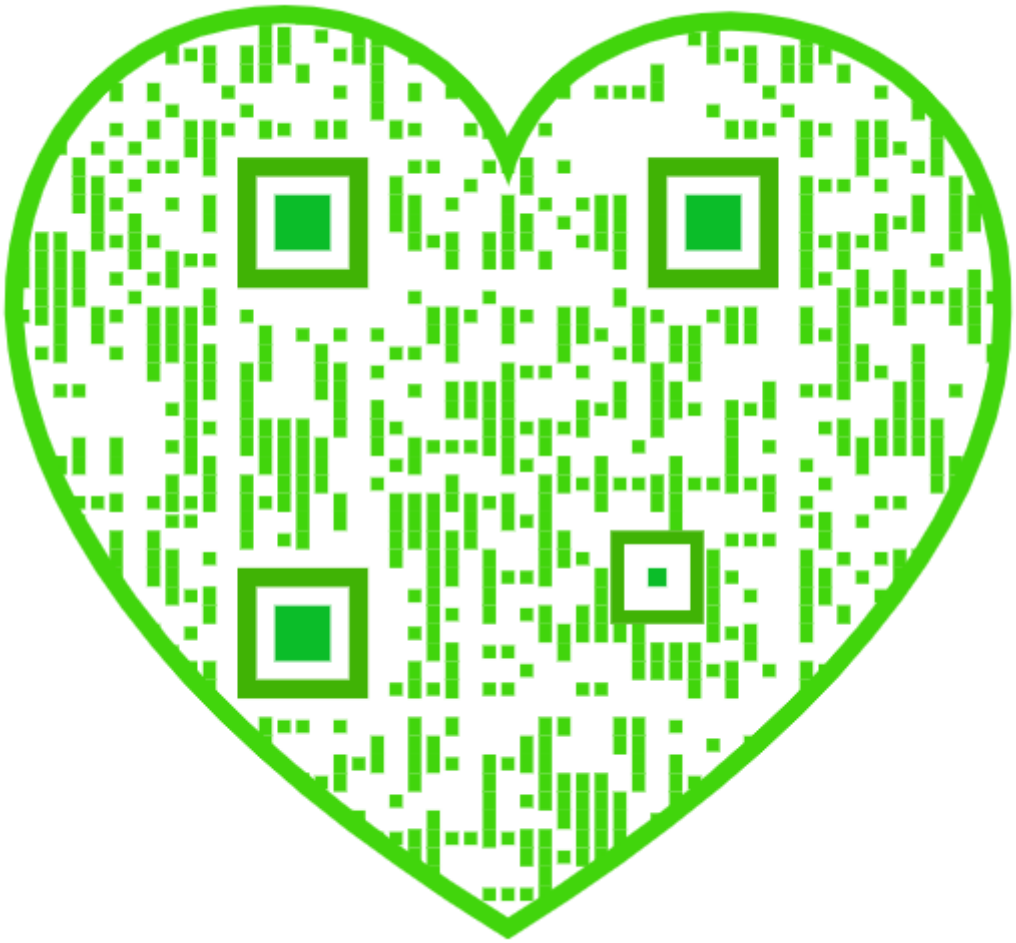

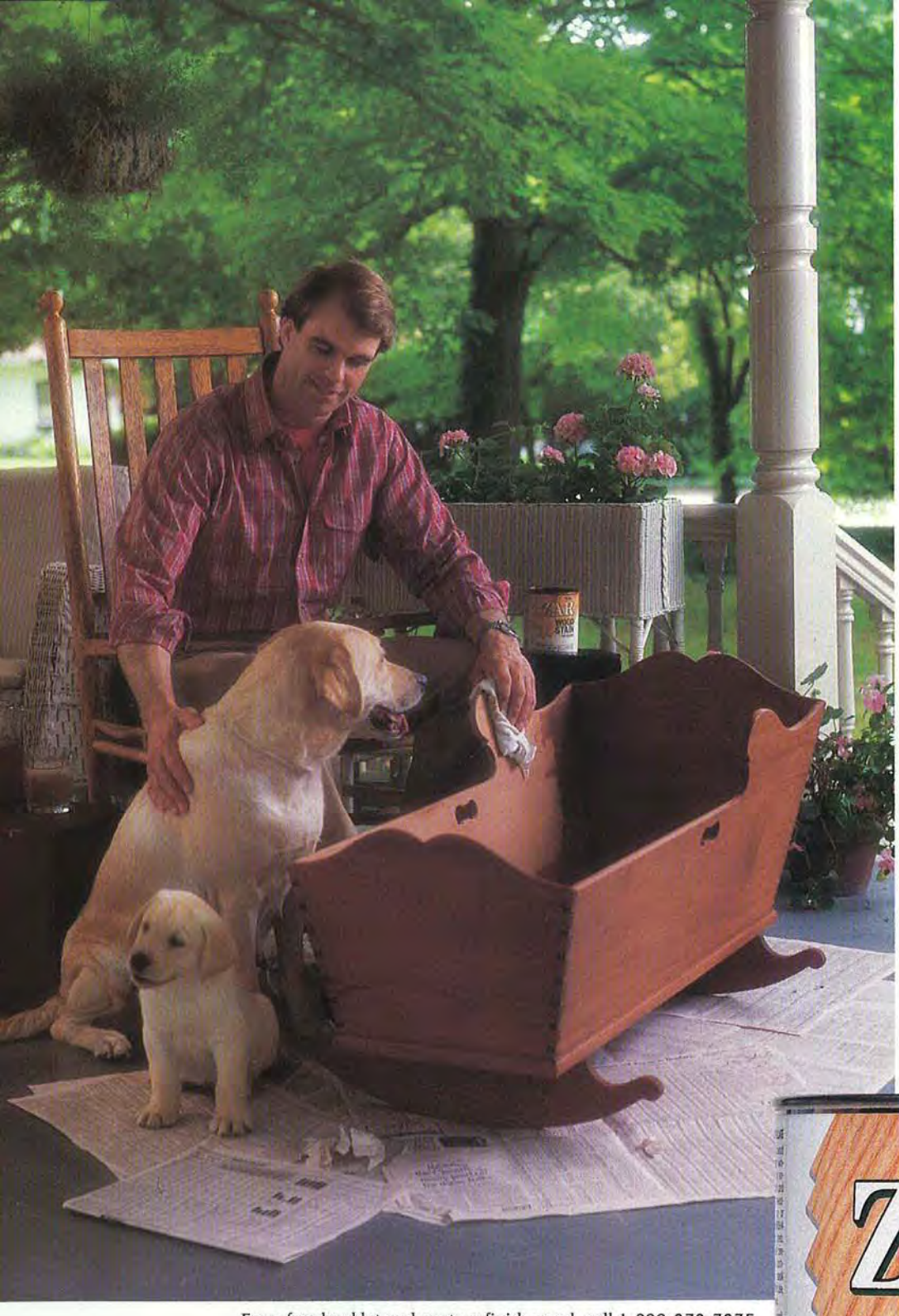

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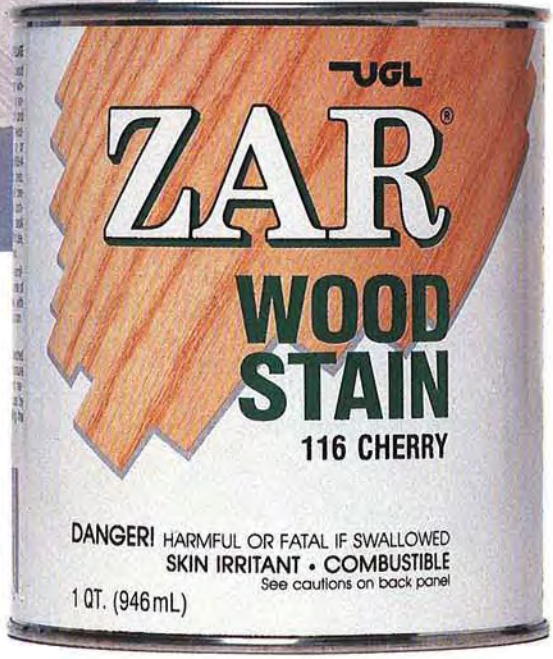

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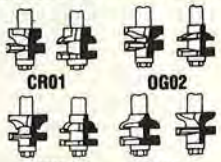

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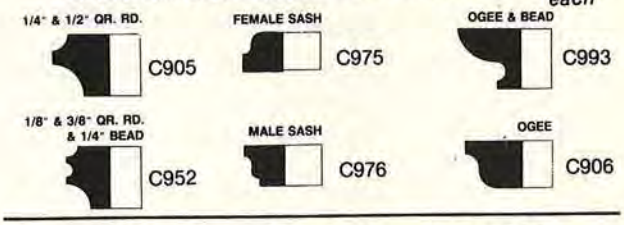

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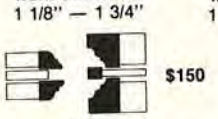

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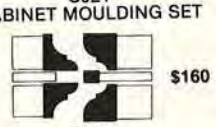

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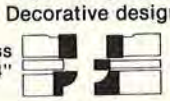

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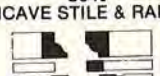

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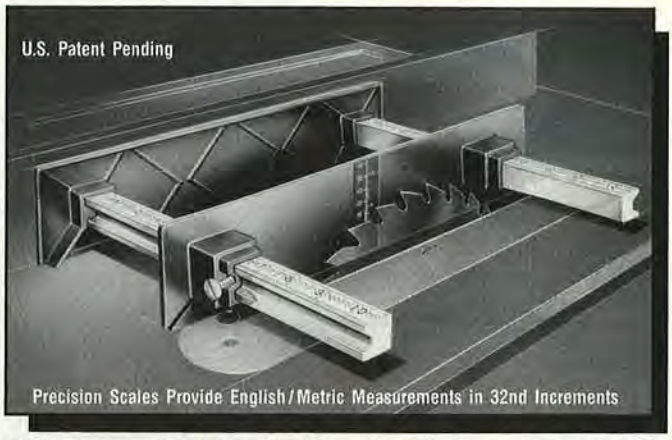

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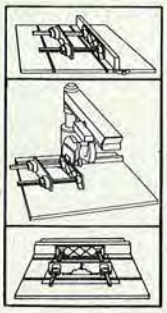

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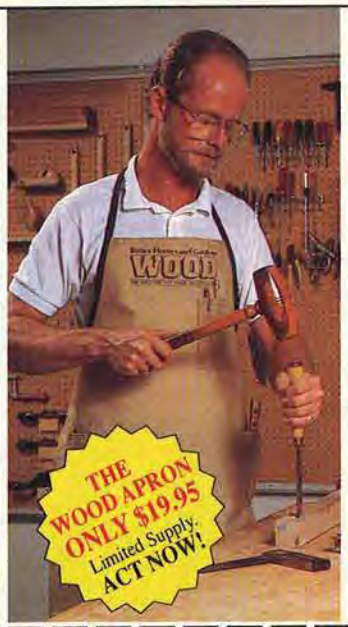

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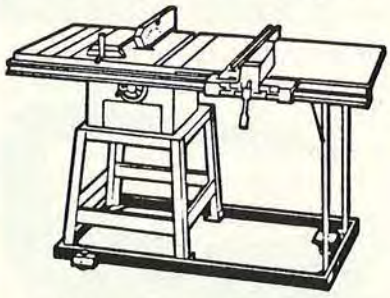

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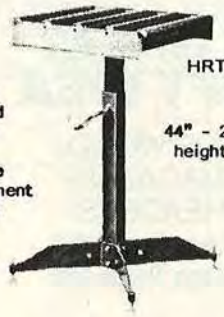

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This issue's cover wood grain: bird's-eye white ash *Cover photo: Hopkins Associates*

APRIL 1991 ISSUE NO. 42

WOOD PROFILE

Honduras mahogany
The classic choice in tropical timber 31

For centuries, furniture designers and woodworkers have prized this red-brown wood's majestic look for tables, cabinets, and more.

CRAFTSMAN CLOSE-UP

Whispering giants 33

For two decades, Hungarian-born sculptor Peter Toth has carved and donated a trail of spectacular tree-sized busts across the continental United States, Alaska, and Hawaii in honor of our American Indians.

CARVING

Tabletop cigar-store Indian 38

Enjoy the challenge of shaping this outstanding scaled-down Indian figure—a common storefront sight of the tobacco shops of yore.

SHOP-TESTED TECHNIQUES

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See what's what with this new breed of environmentally safe products while learning how to apply them with shining success.

Spiced-up spice cabinet 48

Parsley, sage, rosemary, and thyme—these are only some of the many spices that you can store in this attractive Early-American project.

Replanting the family farm 52

Three times a year, tree-loving Kevin Kyhl returns to his native Iowa to replant the family farm—in black walnut, red oak, and ash.

Casual classics 56

Spring into summer with this stylish outdoor furniture set, using the chair plans here, and the table plans in issue 43. Made from beautiful mahogany, the chairs include strong mortise-and-tenon joints.

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Cordless wonders 62

Performance and features drive a wedge between mediocre and great cordless drills. Before you shop, make this your first stop.

TURNING PROJECT

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With this decorative turned base and glass dome, you can display anything from floral arrangements to glittering mineral specimens.

THE CRAFT SHOP

A warm welcome 70

Our sunny Southwest sign gets its relief details from a spinning ⅛" straight router bit.

Stars and stripes wren house 72

Show a little patriotic spirit by building this all-American home for your fine-feathered warblers.

Marbleized masterpiece 74

It may look like marble, but this modern shelf clock fools the eye with a fantastic faux finish.

SHOP-TESTED TECHNIQUE

Painted stone finishes 76

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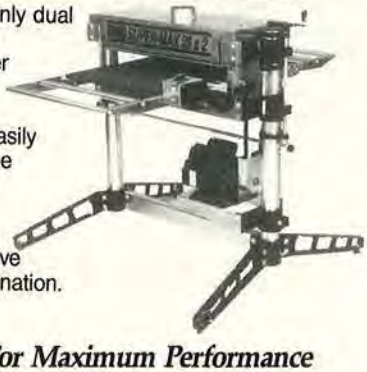

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THE EDITOR'S ANGLE

REINFORCEMENTS HAVE ARRIVED...

...AND JUST IN THE NICK OF TIME!

In this space in the January issue, I told you how excited we were to be publishing two more issues each year. Here, though, I'd like to share a bit about the three new people we have hired to help make these extra 120 or so pages of woodworking information happen. They've been on board for a few months now, and I'm happy (and relieved) to say that all three appear to be up to the task. Here goes:

The three newest members of the Wood magazine team: (l. to r.) Larry Johnston, Rosemarie Burch, and John Hofheimer.

Rosemarie Burch, the latest addition to our secretarial corps, told me during her interview that she's highly organized, responsible, honest, and friendly. I knew right away I wanted to hire her. In addition to her secretarial duties, Rosemarie does a great job of filling your orders for back issues, indexes, aprons, and all of our other ancillary products.

John Hofheimer, a former *Arkansas Gazette* bureau chief, joins us as copy/production editor. During the past 10 years, he's been a writer, columnist, editor, and photographer. John, his wife Lea, and their newly arrived baby girl Julia picked up all their belongings in Winchester, Virginia, bid the *Northern Virginia Daily* a hearty good-bye, and came west to be part of the best darned woodworking publication going. Welcome, John!

Larry Johnston, our new special-interest editor, will develop and write material for The Craft Shop, as well as for our expanded coverage of carving and turning. Larry comes to us from Aurora, Colorado, where he and his brother owned and operated a tree-trimming business. A successful free-lance writer, he's also been the news editor of a daily newspaper, and a field representative for a U.S. congressman. You'll enjoy reading the material that Larry produces. I know I do.

Well, that's the new crew. All seem as committed as we are to continuing to produce the best magazine possible.

Larry Clayton

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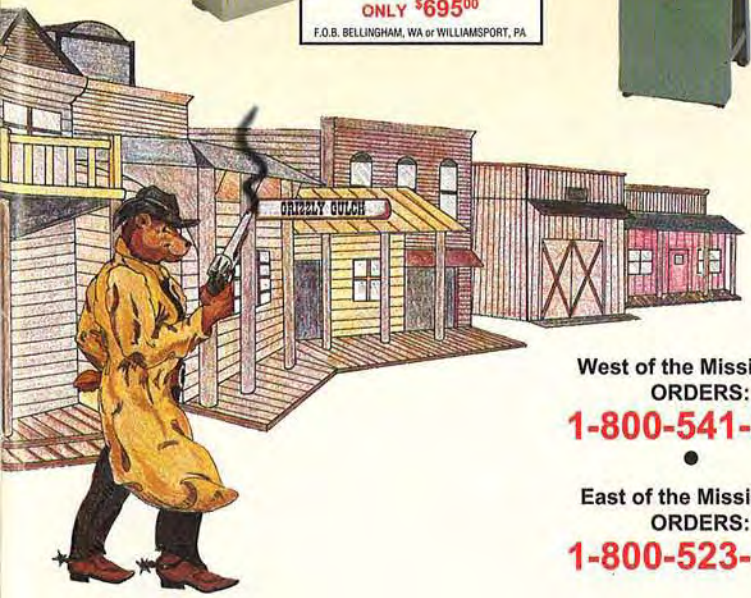

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TALKING BACK

We welcome comments, criticisms, suggestions, and even compliments. Send your correspondence to: Talking Back, Better Homes and Gardens® *WOOD*® magazine, P.O. Box 11454, Des Moines, IA 50336-1454.

Scrollsawer frets over lack of patterns

My hobby is fretwork scrollsawing, but I am limited to patterns. My only source is from Patrick Speilman and James Reidle—a really nice man by the way. I have written lots of companies, but no help.

— Boyd Pearson, Amory, Iowa

Boyd, we empathize with your frustration. We published a fairly ambitious scrollsaw hummingbird pattern in January and will generally have one or more such projects per issue, usually in the new Craft Shop section. In our other publication, Weekend Woodworking Projects®, *we typically run one or two scrollsaw patterns in each of its bimonthly issues. Also, the spring 1990, woodworking catalog of the American Booksellers Association listed seven books of patterns—all by Speilman. In case they somehow escaped your notice, he published three books in 1990—*Scroll Saw Country Patterns, Scroll Saw Fretwork Techniques and Projects, *and* Speilman's Original Scroll Saw Patterns.

Maybe other readers will send us suggestions.

WOOD magazine brings Desert Shield airman closer to home

I've been meaning to write, but just never found the time. I'm currently deployed in support of Operation Desert Shield and have plenty of time for letters. I've enjoyed your magazine for more than a year now. I built the cabinet you featured on a cover of a recent issue. I don't usually follow plans, but I really enjoyed that project and it looks very nice on the bathroom wall.

Just prior to leaving home, I bought a Powermatic 63 tablesaw, based on the recommendation of your tablesaw feature. My wife sent me the most recent issue of your magazine.

Reading *WOOD*® has brought me a little closer to home. Any chance of becoming a monthly?

— John E. Stowe, Capt. USAF

Cap'n, we're glad to hear that reading WOOD *magazine makes you feel closer to home. As for becoming a monthly, stranger things have happened. Recently we've increased our output to eight issues a year.*

Continued on page 10

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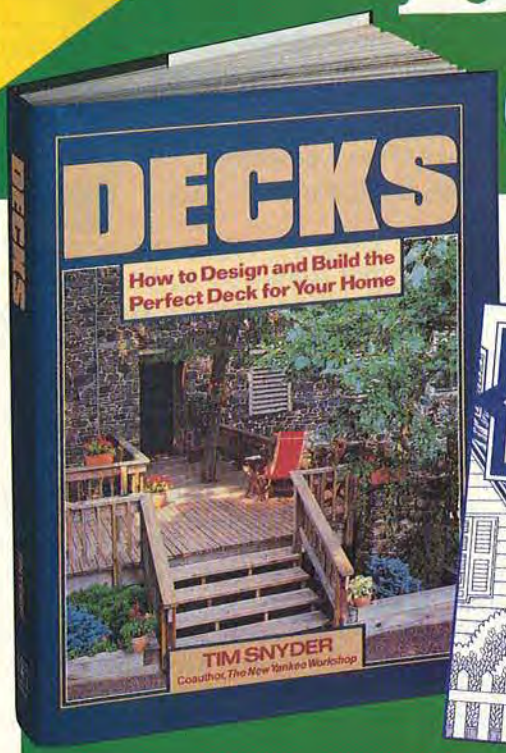

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TALKING BACK

Continued from page 8

We call 'em like we see 'em

I've spent many enjoyable hours reading your magazine, but, frankly, your tool comparisons stink! You do a fine job showing the technical differences between the tools, but please tell us which ones work best. Try grading the tools from 1 to 10, or darkening circles like Consumer Reports.

—Bill Malmsten, Dearborn Heights, Mich.

Bill, we strongly disagree with your assessment of our tool comparisons. Several months ago, we started making recommendations. One of many innovations our products editor, Bill Krier, has brought recently to this magazine is the color-coded rating system you'll find used in the six-page cordless-drill comparison, beginning on page 62. When we do power tool comparisons, we take a two-pronged approach. First, we run each tool through a series of woodworking operations to see which tools perform best. (Typically, we rely on people in the woodworking and building trades to give us a thorough helping hand.) And second, we look at all the features the tools provide, including accessories, bearings, working capacities, overall quality, power, price, and other relevant points.

After compiling our information, we organize and write our articles, telling readers which tools do what best, and which may be the best buy. In our February 1990 issue, for example, we looked at 22 routers made by 14 manufacturers. We told readers which models work best for router tables, what buying points to consider, and finally, which routers we liked best.

As always, we provide readers with smart choices, letting them be the final judge. After all, everyone's tool needs are different.

Magazines to fill those arid hours

While working out in the middle of the desert for Operation Desert Shield, my men and I love to read your magazine. We have nothing to read here at night and get to go to the PX [only] once a month. And I haven't seen your magazine for sale out there yet. If you could, please send one or two copies of your magazine to us guys in the desert.

—SSG Ronald A. Johnson, Saudi Arabia

Sarge, thanks for writing. Good luck finding wood to work in the Saudi desert. By now, you should have received the most recent 24 issues of WOOD.

WOOD® magazine is welcome in his shop class

I teach shop in our Christian day school and your magazine has been very helpful to me. The projects and instructional information have given me the ability to be more professional in my position. Many of my students have built the projects published in your magazine. I'm really grateful for *WOOD* magazine. In many ways, it is almost like a text book to me.

—Rev. Howard R. Burnham, Couldersport, Pa.

Thanks for the kind words. We are always happy to hear that our magazine is helping to introduce and teach our favorite hobby to future generations of woodworkers.

We believe you can't beat learning by doing, and we include projects in each magazine that would be suitable for beginning woodworkers, intermediate woodworkers, and advanced woodworkers. Keep up the good work.

Woodworker sings praises of his tools

Here are some lyrics I wrote the other day while out of town and missing my tools. They should be sung to the tune of "I Walk the Line" by Johnny Cash.

The Woodworker's Tool Song

I keep a close watch on these tools of mine.
I keep them bright and shiny all the time.
I keep the sawdust up and in the bin.
Because they're mine—I make them shine.

My rosewood squares are straight and very true.
A little pastewax keeps them looking new.
I put them neatly away when each day's thru.
Because they're mine—I make them shine.

My saw is sharp—the teeth are set just right.
The blade is carbide tipped to give it extra bite.
The sliding rip-fence locks down very tight.
Because they're mine—I make them shine.

My Lufkin tape is always at my side.
My Craftsman plane shaves boards that are too wide.
I drill the holes straight with my Stanley guide.
Because they're mine—I make them shine.

—Don Marshall, Hazelwood, Mo.

Don:
We're glad you show respect for all your tools,
And keep them polished like they're precious jewels.
Although in some shops chaos often rules,
Because they're thine, you make them shine.

Continued on page 12

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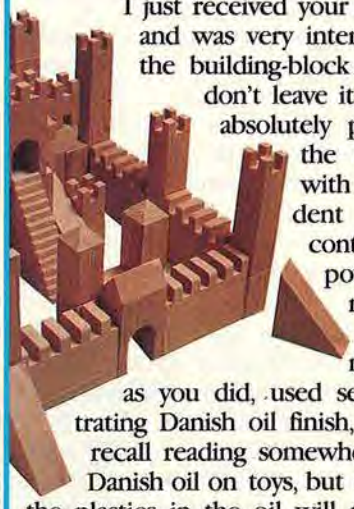
TALKING BACK

Continued from page 11

Reader asks pointed question



I just received your December issue (No. 39) and was very interested in the article about the building-block castle. But please, please don't leave it unfinished unless you are absolutely positive it won't fall into the hands of children. Even with the best sanding, it will dent and splinter and can continually "dust off" with a powdery residue. I have made several toys from redwood, and wishing to maintain the natural look as you did, used several coatings of a penetrating Danish oil finish, sanding between coats. I recall reading somewhere of a caution regarding Danish oil on toys, but the polymerizing action of the plastics in the oil will render the finish perfectly safe within a 30-day period.

—Don Honenberger, Los Angeles

Don, your suggestion puts a terrific finish on a great project. We think the blocks are safe for children, but Danish and tung oils would be good choices for anyone wanting to finish the castle.

Unintentional silicone transfer can mar your finish

For a number of years, my wife has used Pledge in a spray can to wax a pair of oak end tables I had made. We kept a brass lamp on each table. The lamps had fuzzy, felt pads on their bottoms to prevent scratching. Recently, while we were moving, one of the lamps was placed temporarily on a walnut table. When I removed it after only a few hours, I noticed a round shiny circle where the lamp had been. A quick touch confirmed my suspicions that the silicone in the spray wax had impregnated the felt bottom of the lamp and was being transferred to any object it was set upon.

Luckily, I was able to remove the silicone right away with mineral spirits, but the lamp's felt bottom needed replacement. The oak tables needed extensive cleaning. I was surprised the pad picked up the silicone and contaminated another object.

—Lenny Nowak, Leola, Pa.

Lenny, we don't know how widespread the silicone-contamination problem is, but it rang a bell with our project builder, Jim Boelling. Jim had a similar problem, also with a felt-bottomed brass item, and has avoided silicone-based furniture treatments since then. It's important to pay attention to which finish is most appropriate for which job in an increasingly chemical environment. Thanks for telling us your problem.

4-H program introduces young women to woodworking, too

Thanks to you, this has been my best year yet in 4-H. This woodworking award pin is my first project award. My father is known as quite a woodworker, and he learned the trade from my grandfather. I hope to carry this tradition on into my adulthood. I have made a birdhouse and a peg-board, rebuilt a washstand and made wooden tray favors for the Fourth of July celebration at the local hospital. Next year I may build a corner china closet or maybe a large shelf with mirror. I am particularly proud of my Iowa State Fair blue ribbon. Thanks!

—Debbie Fitkin, Cedar Falls, Iowa

Thank you for the 4-H pin. Woodworking is fun.

—Amanda Spraggs, Fancy Farm, Ky.

Thank you for sponsoring my woodworking pin at the Sheridan County [Nebraska] Achievement Banquet. My project ideas came from *WOOD* magazine. I'm now doing another *WOOD* project for a school industrial arts program.

—Dina Jensen, Hay Springs, Neb.

Debbie, Amanda, and Dina, we appreciate your thank-you notes for the Wood Science Recognition Medals you received recently. Congratulations on having earned them through your involvement in the 4-H Wood Science Program. You are among the 100,000 students who participate each year. We are happy to be a sponsor of this important program—along with DEFT, Inc., and The Society of Wood Science—because we feel that woodworking is one of the most pleasurable of pastimes. It is a fast-growing leisure-time activity for men, women, and youngsters.

When wooden friction is the foe, plastic may put ducks in row

Regarding your October 1989 article on Waddles the Duck, I discovered that threading a nut onto a dowel was easy if I first rubbed paraffin or beeswax on the dowel. I cut a small plastic washer from a margarine container and placed it between the duck's head and body during assembly. Also, I use plastic washers just about any time I have wood rubbing against wood, such as wheels against body.

—M.P. Jacobs, Merrillville, Ind.

M.P., great idea, especially because plastic washers cut easily to size and shape for concealment.

Super 125 Planer
On Sale $359.95

This machine will pay for itself time and again by planing your own wood. Finishes wood like machines many times its price.

• **Portable** at 65 lbs • **Power feed**
•12 1/2" wide High Speed Steel Knives
Shipped assembled and ready to run.

SPECIFICATIONS:
Motor: 16Amp, 115V, 8000RPM, 2HP• 26.2 fpm auto feed rate • 16,000 Cuts/min • Thickness of stock: 3/16" - 6" • 1/8" Max depth of cut • 2 HSS knives
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Planer Accessories

Free plans for roller stand with purchase of rollers

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High Speed steel, 12-1/2" long.
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For vacuum takeoff of wood chips.
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Drilled for Super 125 Planer. 27-1/4"High.
#PST ...(Reg $44), **On Sale...$39/ea** (UPS $6)

Roller Stand
HTC brand support stand w/heavy duty ball bearing roller. Height adjusts from 25" - 44".
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Ball Bearing Rollers
(Minimum purchase 2 rollers). Build a roller stand, infeed/outfeed table etc. with these 13" X 2" Heavy Duty rollers. Inclues **FREE** plans for roller stand shown above.
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4" x 8" Sander
Model #S48... Only $114.95 (UPS $8)
A unique design with an 8" disc & 4" x 36" belt. Portable at only 38 #, includes quick release lever for belt changes.
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Features of Both Models:
• **Dust collection outlets included.**
• Tables: tilt to 45º, includes mitre gauge, moves to vertical belt position.
• Easy belt tracking adjustment.
• Belt table tilts/locks to horiz & vert positions
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Specifications:	DC-1	DC-2
Motor	1 HP, 110/220V	1-1/2 HP, 110/220V
Outlets	1 @ 4"	2 @ 4" or 1 @ 6"
Flow	610 CFM	900 CFM
Bags	2 @ 20 Gal.	2 @ 30 Gal.
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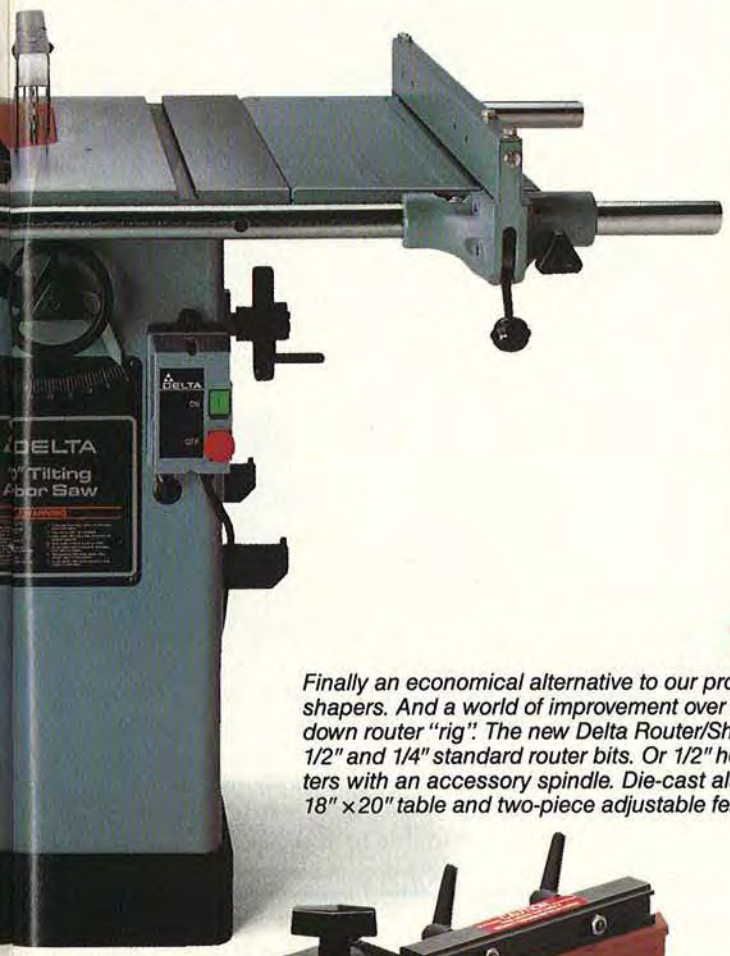
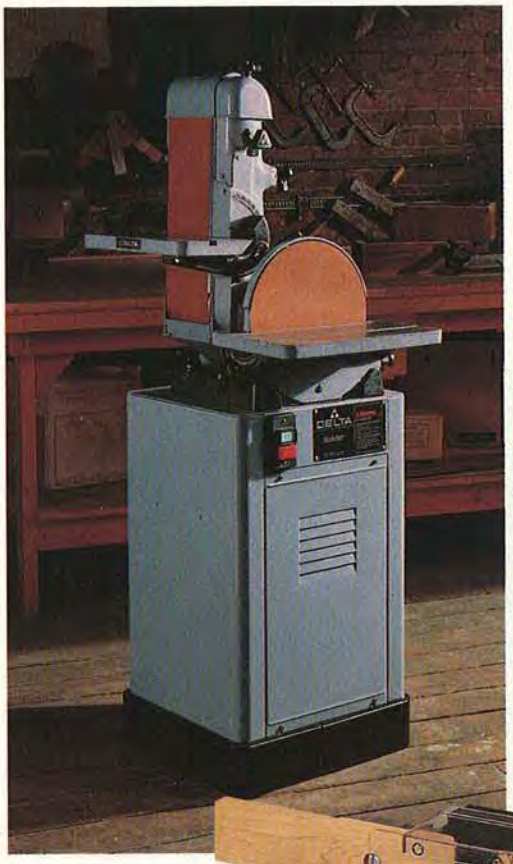
em as time machines.

We've thrown out all the rules with this one. The Delta Electronic Measuring System virtually eliminates measuring for width of cut. Accurate to .005" with Unifence® Saw Guide, Jet Lock® rip fence or most other fences. Also available for vertical application on thickness planers and drill presses.





We believe in finishing what we've started. Good example is our Combination 6" Belt/12" Disc Sander. We cover your sanding needs ranging from a tiny 1" Belt Sander all the way up to our large 6"×132" Edge Sander with edge contour sanding capability.

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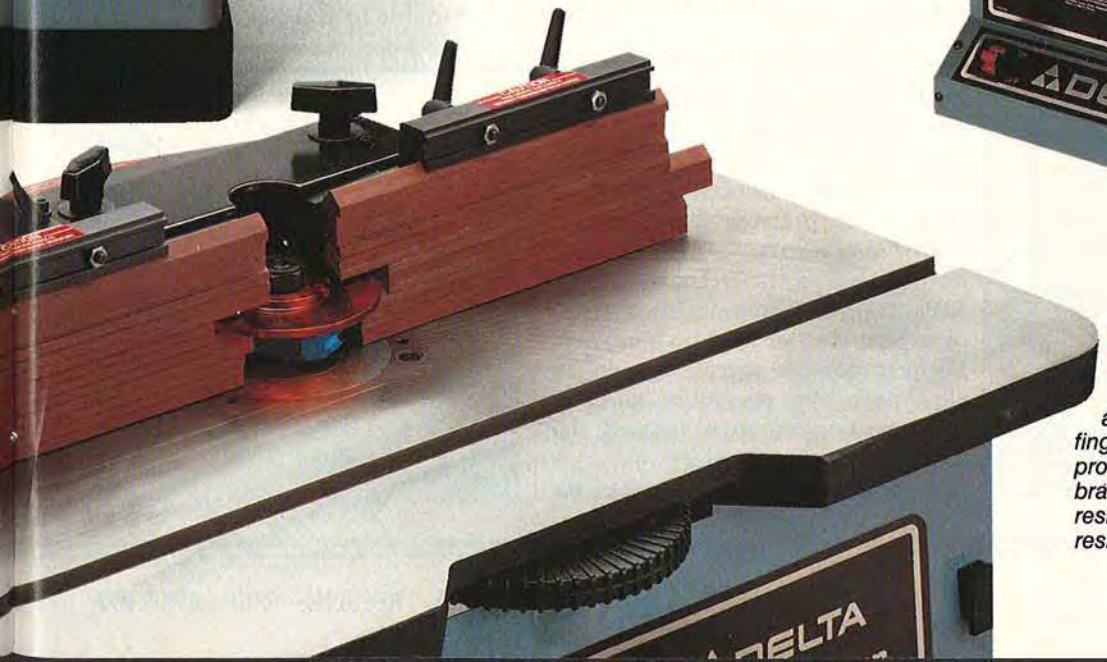

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EARN CASH, PRIZES FOR YOUR TOP SHOP TIP

Do you have a great shop tip (or two) you'd like to share with other *WOOD*® magazine readers? For each published submission, you will get at least $25 from *WOOD* magazine (as much as $200 if we devote a page or more of space elsewhere in the magazine to your idea). You also may earn a woodworking tool for submitting the top shop tip for the issue.

We try not to use shop tips that have appeared in other magazines, so please send yours to only one. We do not return shop tips. Mail your tips, address, and daytime phone number to:

Top Shop Tip
WOOD Magazine
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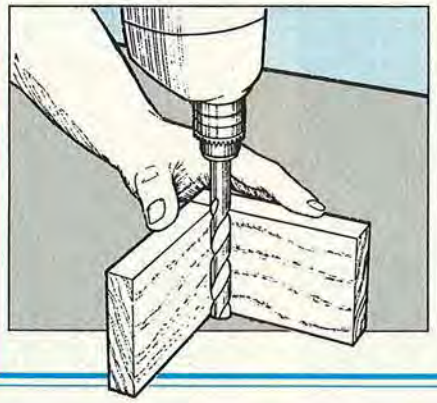
Des Moines, IA 50336-1454

Simple jig for perpendicular holes

Some projects call for you to drill holes perpendicular to a work surface. But, what do you do if the piece is too large for your drill press, and you don't own a drilling guide for your portable drill?

TIP: Join two blocks of wood at a 90° angle as shown *below*. By holding your drill bit in the corner of this simple jig, you can accurately bore perpendicular holes with many sizes of twist and brad-point bits.

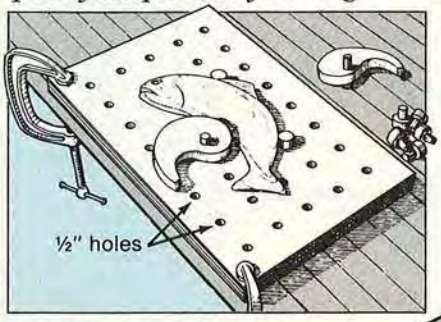
—Mike Fagan, Elgin, Ore.



TOP SHOP TIP

A cam-do carving hold-down

For safe and effective carving of flat workpieces, you must secure the carving in a way that frees both of your hands and doesn't mar your masterpiece. It sure would be nice to have a hold-down that quickly adapts to any carving.



TIP: Drill a series of ½" holes, set apart 2" on center, into a piece of ¾×12×18" plywood (or larger if desired). Then, make at least two T-shaped pins from 1¼" lengths of ½" dowel and ¾" lengths of 1" dowel such as those shown *above*. Drill a ½" hole, ½" deep, into the center of the 1" dowel lengths and glue and insert the ½" dowel pieces. From ¾" solid stock, cut a cam according to the full-sized pattern *above*, and drill a ½" hole as indicated. Glue a 1¾" length of ½" dowel into the hole in the cam so ½" of dowel protrudes from each face. Now, you can hold a carving of most any shape between at least two pins and the cam. Clamp the board to your workbench or hold it in your lap, whatever's most comfortable to you.

—Gordon Humphrey, Victoria, B.C.

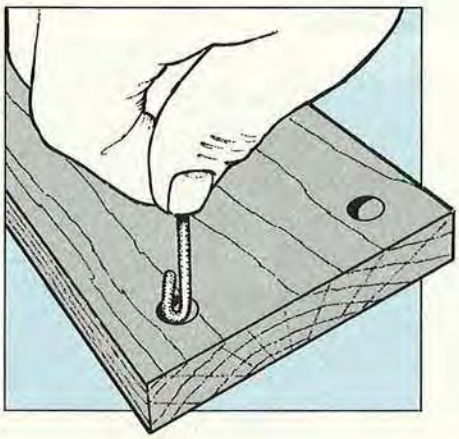
For his tip, Gordon receives a Freud model CE82 3¼" power planer.

How to get glue into those dowel holes

Applying adhesive to the walls of a dowel hole without making a gluey mess of the area around the rim of the hole can be difficult.

TIP: Apply the glue with a bent-over pipe cleaner as shown at *right*. You can get the correct amount of glue onto the necessary surfaces without a mess, then discard the inexpensive pipe cleaner.

—Ralph A. Sprang, Jr., Columbia, Md.

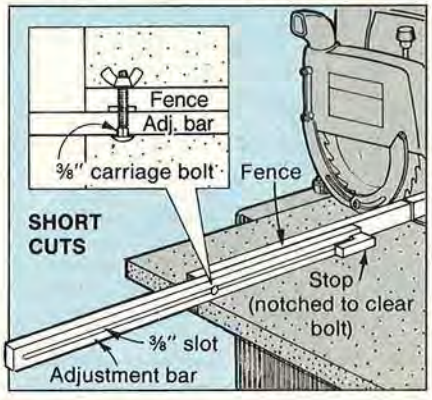


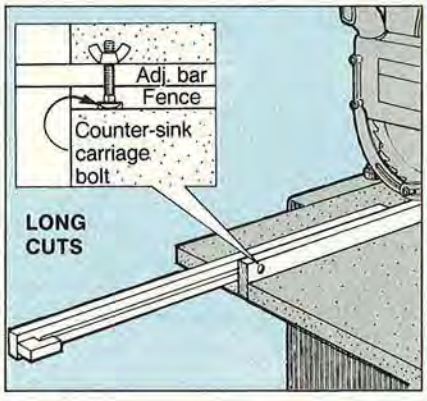
Extendable stop for radial-arm saws

You can purchase or rig all sorts of cut-off stops that clamp to the fence of your radial-arm saw. But, these stops limit the length of your repetitive cuts because they extend no further than the ends of your fence. Here's a better idea.

TIP: Build an extendable stop such as the one *below* for your radial-arm saw. From a ¾×1½" length of straight-grain hardwood, cut the adjustment bar to a length that suits most of your projects (mine adjusts for cuts from 0-60"). Rout a ⅜" slot through the bar, and screw an L-shaped stop to one end. Drill a 7/16" hole near the end of your fence, and secure the adjustment bar to the fence with a ⅜" carriage bolt as shown in the Short Cuts and Long Cuts drawings, *below, left* and *right*.

—Steve Lively, Brainerd, Minn.



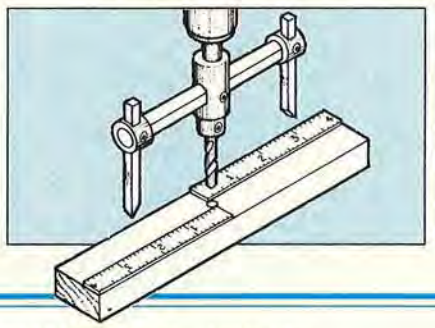


Jig makes for quick adjustment of circle cutter

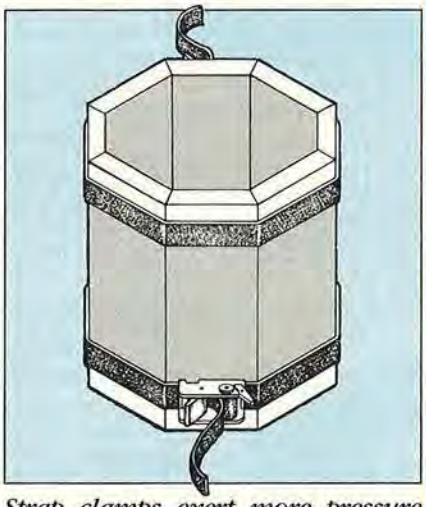
Circle cutters often require a lot of trial-and-error adjustments.

TIP: Cut a piece of ¾×1½" stock to a length equaling the maximum diameter of your circle cutter. Mark a line across the width of the block at its midpoint, and drill a ¼"-deep hole with the pilot of your circle cutter at the center of this line. Then, apply two strips of measuring tape. (You can buy the tape from many hardware stores and catalogs. Apply just one strip if your cutter has only one blade). To get a precise reading of your circle cutter's radius, lower the pilot into its hole and align the cutting point with the rule.

—From the WOOD magazine shop



Strap-clamp pointer



Strap clamps exert more pressure near their ratcheting mechanisms than in the middle of the straps. This uneven pressure can contribute to weak glued joints.

TIP: You can distribute that pressure more evenly by positioning the clamps opposite each other, as shown in the drawing *above*.

—From the WOOD magazine shop

Continued on page 18

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TIPS FROM YOUR SHOP (AND OURS)

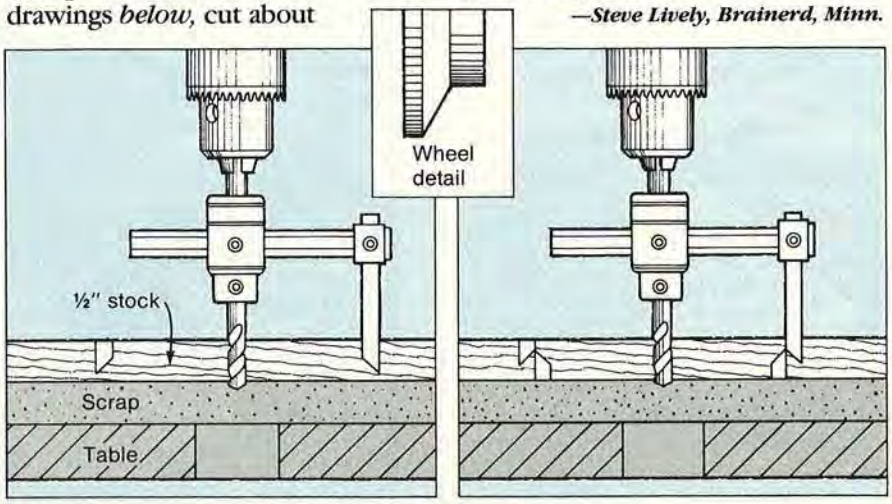
Continued from page 17

Toy train wheels in a snap

Kids love toy trains, but making all the necessary wheels can take considerable time and effort.

TIP: You can turn out train wheels in no time with your circle cutter and this procedure. As shown in the drawings *below,* cut about two-thirds of the way through a piece of ½"-thick solid stock, and then flip over the workpiece and extend the arm by one cutter width. Now, complete the cut from the opposite face. For consistently shaped wheels, set the depth stop on your drill press for the first cut.

—Steve Lively, Brainerd, Minn.

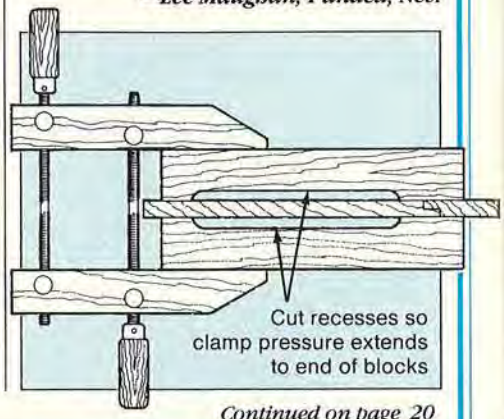


Make those handscrew clamps work harder

Few clamps have the versatility of handscrews, but even these helpers will not apply pressure more than a few inches over the edge of your workpieces.

TIP: Cut ⅜"-deep recesses into two 2×2×12" hardwood blocks. Now, use these blocks to extend the reach of your handscrews.

—Lee Maughan, Panaca, Nev.



Continued on page 20

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T100B	1/4	Corner Round	1/8	3/4	5/16	10.00
T101B	1/4		3/16	7/8	3/8	11.00
T102B	1/4		1/4	1	7/16	12.00
T103B	1/4		5/16	1-1/8	1/2	13.00
T104B	1/4		3/8	1-1/4	5/8	14.00
T105B	1/4		1/2	1-1/2	3/4	16.00
T107B	1/2		1/4	1	7/16	13.00
T110B	1/2		1/2	1-1/2	3/4	16.00
T111B	1/2		5/8	1-3/4	7/8	19.00
T112B	1/2		3/4	2	1	21.00
T113B	1/2		1	2-1/2	1-1/4	32.00
T115B	1/2		1-1/4	3	1-1/2	43.00
T200B	1/4	Beading	1/8	3/4	5/16	10.00
T201B	1/4		3/16	7/8	3/8	11.00
T202B	1/4		1/4	1	7/16	12.00
T203B	1/4		5/16	1-1/8	1/2	13.00
T204B	1/4		3/8	1-1/4	5/8	14.00
T205B	1/4		1/2	1-1/2	3/4	16.00
T207B	1/2		1/4	1	7/16	13.00
T210B	1/2		1/2	1-1/2	3/4	16.00
T211B	1/2		5/8	1-3/4	7/8	19.00
T212B	1/2		3/4	2	1-1/4	21.00
T213B	1/2		1	2-1/2	1-1/4	32.00
T215B	1/2		1-1/4	3	1-1/2	43.00
T301B	1/4	Roman Ogee	5/32	1-1/8	15/32	15.00
T302B	1/4		1/4	1-1/2	21/32	16.00
T303B	1/2		5/32	1-1/8	15/32	15.00
T304B	1/2		1/4	1-1/2	21/32	16.00
T901B	1/4	Cove	1/4	1	3/8	11.00
T902B	1/4		3/8	1-1/4	1/2	12.00
T903B	1/4		1/2	1-1/2	5/8	13.00
T904B	1/2		1/4	1	3/8	12.00
T905B	1/2		3/8	1-1/4	1/2	13.00
T906B	1/2		1/2	1-1/2	5/8	14.00
T2501B	1/4	Cove Beading	3/16	1	1/2	12.00
T2502B	1/4		1/4	1-1/8	9/16	13.00
T2503B	1/4		5/16	1-1/4	5/8	14.00
T2505B	1/2		5/16	1-1/4	5/8	13.00
T2502B	1/2		1/4	1-1/8	9/16	14.00
T2503B	1/2		5/16	1-1/4	5/8	15.00
TC8B	1/4	Classical	1/8	1-1/8	1/2	19.00
TC8B	1/2		1/8	1-1/8	1/2	19.00
TC12B	1/4		3/16	1-3/8	11/16	20.00
TC12B	1/2		3/16	1-3/8	11/16	20.00
TC16B	1/4		1/4	1-5/8	13/16	20.00
TC16B	1/2		1/4	1-5/8	13/16	20.00
T7506B	1/4	Ogee	1/8	1-1/8	1/2	21.00
T7506B	1/2		1/8	1-1/8	1/2	21.00
T7508B	1/4		3/16	1-3/8	5/8	23.00
T7508B	1/2		3/16	1-3/8	5/8	23.00
T601	1/4	Core Box	1/4	1/4		9.00
T602	1/4		3/8	3/8		10.00
T603	1/4		1/2	3/8		12.00
T604	1/4		5/8	5/8		13.00
T605	1/2		3/4	5/8		14.00
T607	1/2		1	3/4		17.00

Tool No.	Shk Dia.	Diagram	Cutting Dia.	Cutting Len.	Price
T401B	1/4	45° Chamfer	1	3/8	11.00
T402B	1/4		1-3/16	1/2	12.00
T403B	1/4,1/2		1-3/8	5/8	13.00
T404B	1/2		1-5/8	3/4	16.00
T406B	1/2		1-7/8	1	18.00
T701	1/4	V Groove	3/8	1/2	8.50
T702	1/4		1/2	1/2	9.50
T704	1/2		3/4	5/8	12.00
T706	1/2		1	3/4	15.00
T801	1/4	Half Round	15/16	1/4	17.00
T802	1/4		1-1/16	3/8	18.00
T803	1/4		1-3/16	1/2	20.00
T805	1/4,1/2		1-7/16	3/4	23.00
T806	1/2		1-9/16	7/8	25.00
T807	1/2		1-11/16	1	29.00
T1501B	1/4	Slot Cutter	1-1/4	1/8	14.00
T1503B	1/4		1-1/4	1/4	14.00
T1506B	1/4	Rabbet	1-1/4	1/2	12.00
T1512B	1/2		1-1/4	1/2	13.00
T2601	1/4	Keyhole	(Carbide Tipped) 1/4	3/16	7.50
T2201s	1/4	Straight Single flute	1/8	1/2	5.50
T2202s	1/4		3/16	1/2	5.50
T2205d	1/4		1/4	3/4	6.00
T2207d	1/4		3/8	1	6.00
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T2313d	1/2		1/2	1-1/4	13.00
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T2318d	1/2		3/4	1-1/4	12.00
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T1606	1/2		1	7/8	7.50
T1607	1/2		1/2	1/2	5.50
T2001B	1/4	Flush Trim	3/8	1/2	7.00
T2003B	1/4		1/2	1/4	7.00
T2004B	1/4		1/2	1	7.50
T2008B	1/2		1/2	1	8.00
T2101	1/4	Mortising	1/2	13/32	6.00
T2102	1/4		5/8	9/16	7.00
T2103	1/4		3/4	3/4	8.00

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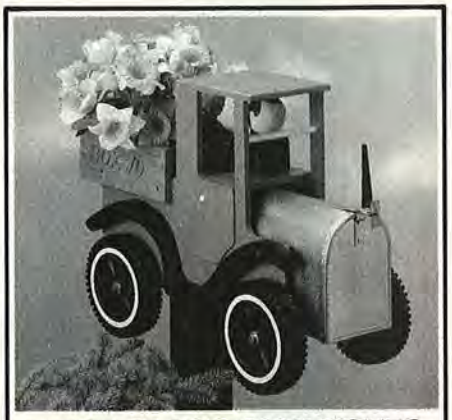

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TIPS FROM YOUR SHOP (AND OURS)

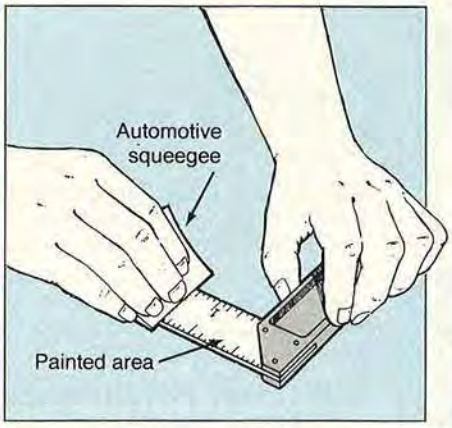
Continued from page 18

A no-squint improvement for your squares

Most combination and try squares are difficult to read. Why? Their blades have stamped markings that don't contrast sufficiently with the rest of the blade.

TIP: Spray or spread a thin coat of black epoxy enamel paint onto the blade, and then wipe away the excess paint with a squeegee (the type used for auto-body work) or an old credit card as shown *below, left.* This will leave most of the paint in the indentations, making them more visible. After the paint dries, remove any streaks between the indentations with fine-grade steel wool as shown *below, right.*

—Raj Chaudhry, Astoria, N.Y.



More tips from our woodworking pros

- Some projects require facing pieces with perfectly aligned dadoes. To accomplish this task, see Steps 1 and 2 and the sketch on page 48.
- For drawer fronts with recessed pulls, see our router jig on page 51. This helper enables you to make multiple, identical recesses.
- Have you looked for a durable outdoor finish lately? Try spar varnish and the application method on page 61.
- You can create the look of a hand-carved sign in just minutes with a router and ⅛" straight bit. See pages 70-71. Don't tell your friends, though. Let them think you did it completely by hand.
- For helpful hints on carving a human face, see the cigar-store Indian project on page 40.

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MYTHS AND FACTS

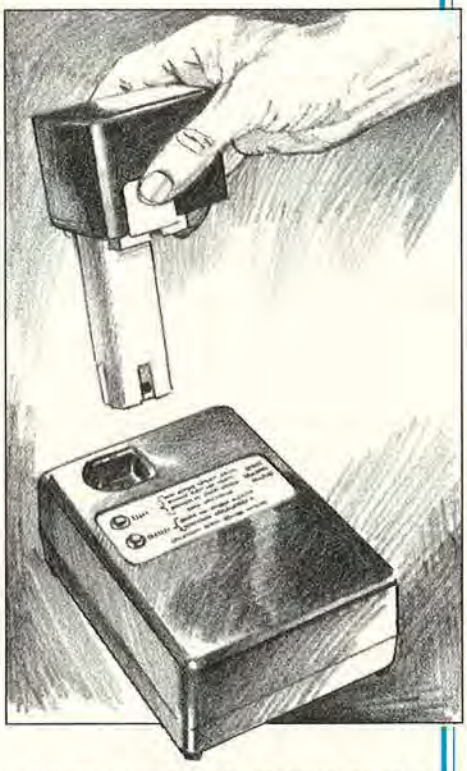
ABOUT THE CARE OF YOUR CORDLESS TOOLS

To find out how to get the most from cordless products, we turned to the people at Gates Energy Products, one of the world's largest manufacturers of sealed nickel-cadmium (ni-cad) batteries. The Gainesville, Florida, company provides batteries for Black & Decker, Makita, Porter-Cable, and Sears Craftsman, among many others. C. L. (Red) Scholefield of Gates passed along these pointers:

Forget the myth about battery memory. During the early 1960s, NASA scientists discovered something peculiar about ni-cad cells of that vintage. The batteries "remembered" lower-than-full-capacity charges if not fully drained and recharged for each use. That's no longer true, because numerous improvements in battery technology, yet the myth persists. Today, you can charge batteries at any time, regardless of the amount of power left in the cells, without reducing the batteries' storage capacity.

Ni-cad batteries work best between 50 degrees and 80 degrees Farenheit. High temperatures rob a battery of life and performance, so avoid charging a battery that's warm to the touch (95 degrees and up). And, don't charge or store a battery in a hot area such as close to a heating source or in open sunlight.

At the opposite end of the thermometer, you should avoid recharging your batteries at below-freezing temperatures. This could damage the battery's chemistry.



Charge your tools at least once a month. Red's advice here: periodically charge your batteries even if you don't plan to use the tool. Why? Because most battery failure results from electrical shorts that develop between the positive and negative plates inside the cells. And, fully charged plates resist shorts better than discharged plates. Remember that a ni-cad battery loses about one percent of its charge during every day of inactivity, reducing it to less than half power after only two months.

Note: For information about quicker recharging times, see Tool Industry Insider on page 84.

Illustration: Jim Stevenson

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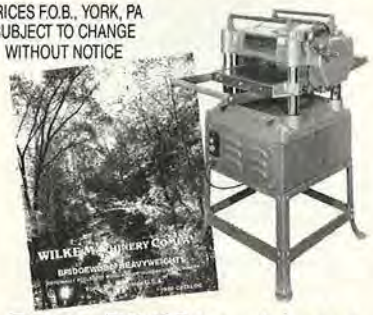
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PRODUCTS THAT PERFORM

Print this article

Double-faced tape: just the right amount of tack

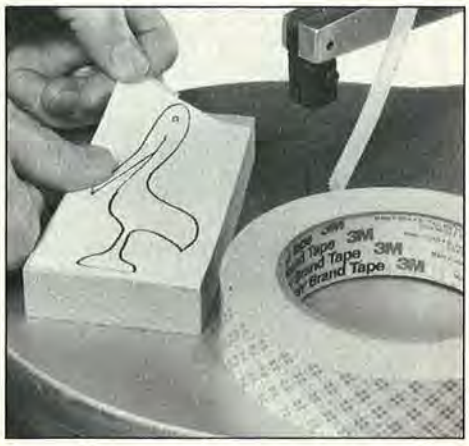
The 3M company makes 120 types of tape, so it didn't surprise me when our search for the ultimate double-faced tape turned up two of its products.

What's so good about these tapes? Unlike some double-faced products, 3M's no. 404 and 410 tapes have just enough tack for the task at hand, but not too much. And, they leave little residue on the project surface.

I prefer the no. 404 tape for holding paper patterns on parts. The higher-tack no. 410 tape firmly holds together wooden parts during sawing and sanding operations.

When the tape did hold a little too well, I applied lacquer thinner, just as I do with other brands of "carpet tape." More good news, using thinner with the 3M tape did not result in the excessive slurry of adhesive goo that sometimes accompanies removal of other tapes.

—Tested by Jim Boelling



You can't buy these tapes at your local hardware store. 3M no. 404 and 410 double-faced tapes, are available only through industrial distributors or by mail from Industrial-Kurtz, 2150 Delaware Ave., Des Moines, IA 50317. Call 515/266-4656. Postage-paid prices for 36-yard rolls of these tapes: No. 404, 2" roll, $20; no. 410, $16 for 2" roll.

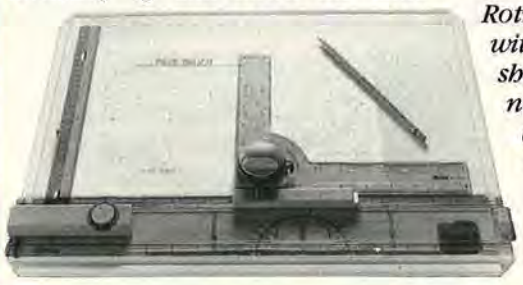
Portable drafting board does it all

In my job as a freelance technical illustrator for *WOOD®* magazine, I do all of my work on a professional-size drafting machine costing hundreds of dollars. So, I was impressed with the Rotring Portable Drawing Board with optional head, because it does as much as my big machine at a fraction of the cost.

The standard unit has a removable, graduated straightedge with built-in protractor that slides effortlessly up and down the table and locks securely in place. Although it's made entirely of plastic, the board proved durable in my tests and dust didn't bother it.

I recommend that anybody buying this table also purchase the optional drafting head. This handy accessory slides along the straightedge and locks at any desired angle, with automatic settings every 15°. You can't go wrong with this handy board.

—Tested by Kim Downing



Rotring Portable Drawing Board with case. Item no. G1303, with shipping, $43.20 (or order item no. G1304, with optional drafting head, $64.40 with shipping)

Call Grizzly Imports: 800-523-4777, eastern U.S., 800-541-5537 western U.S.

Synthesized exotic woods save you money

Like many exotic hardwoods, ebony doesn't come cheap: $35-$45 per board foot for roughsawn stock with its share of defects. You can stain domestic hardwoods black, but that usually yields mixed results, and doesn't work at all for many turning, inlay, and intarsia projects. Now, Supertech Woods has patented a process for treating walnut with nontoxic chemicals to make it look like ebony or rosewood. The process uniformly alters the wood's color throughout its thickness, and makes the walnut 20 percent heavier. The walnut retains its strength and hardness, becoming slightly stiffer. Supertech uses only clear, dimensional walnut, so you obtain a high percentage of usable stock.

I tested a piece of Ebon-X bronze wood that has a tinge of brown in it and bears a striking resemblance to Macassar ebony. The company also makes a jet-black Ebon-X in addition to the rosewood product, and is currently developing a teak substitute. My sample behaved much like walnut during machining. I didn't notice any health irritants. The Ebon-X product also scored well in sanding and gluing. Like most woods, it darkened slightly when I applied a finish.

—Tested by Jim Boelling

Ebon-X woods, about $36–$48 per board foot in dimensioned stock from Supertech Woods, 679 Coover Rd., Delaware, OH 43015. Call 614/363-3800.

Continued on page 24

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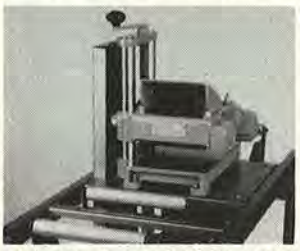

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Continued from page 23

Rock-steady tenoning jig

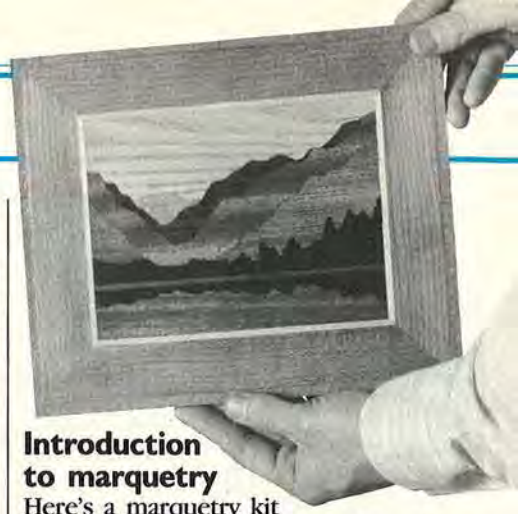
I've cut my share of tenons, and it's always been a challenge to cut tight-fitting tenons of precisely the same size with square and parallel shoulders. The device from Ru-Barb Tools makes tenon making easier and more reliable than any jig I've tried.

The sturdy, well-machined, and largely cast-aluminum jig holds your workpieces rigidly at 90° or 45° angles. My results: 30 test tenons and each fit perfectly. In addition to making tenons, the jig works well for making tongue-and-groove, lap, and finger joints. The unit adjusts to fit saw fences from ⅞" to 1⅞" wide and up to 3" high. Its big comfortable handle provides a sturdy grip.

I found it easier to slide the jig along by waxing the rip fence (paraffin, car, or beeswax work fine). And, I scored my layout lines with a knife to reduce chip-out on the saw-blade exit side of the shoulder cut.

—Tested by Lee Gatzke

Tenon device, $140 ppd. from Ru-Barb Tools, 5-4269-1, Swanton, OH 43558. Call 419/826-8560.



Introduction to marquetry

Here's a marquetry kit that takes you step-by-step through the process. It includes everything: veneer, backing board, design, and instructions. A beginner produced this scene above. The kit is offered in a variety of sizes and designs.

—Tested by Bill Krier

Marquetry kits, available in 12 designs in three sizes: 8×10", $24 ppd.; 11×14", $36 ppd.; and 16×20", $48 ppd. Write to Hardwood Inlays, 16204 92nd Ave. Ct. E, Puyallup, WA 98373. Call 206/848-3019.

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Each package consists of a high-quality, 40-minute VHS tape, a 50-page booklet that includes a cutting diagram, Exploded-View drawing, and full-sized patterns when necessary. The video tape I reviewed detailed construction of a tapered-leg table. I found the instructions for this project clear and easy to follow. The tape and booklet contain a lot of handy tips applicable to any project.

—Tested by Marlen Kemmet

Shopsmith Heirloom Projects, $29.95 from Shopsmith Inc. Call 800-543-7586 to order or for the location of your nearest store.

Continued on page 26

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Maple (Hard)	4/4	Select	1.55
Maple (Soft)	4/4	Select	1.25
Pecan	4/4	Select	1.30
Poplar	4/4	Select	1.20
White & Red Oak	4/4	Select	1.80
Walnut	4/4	Select	2.50
Cedar (Aromatic Red)	4/4	1C+Btr.	1.25
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A03

PRODUCTS THAT PERFORM

Continued from page 25

Turn your 5-gallon bucket into a tool carrier

Tradesmen have long used recycled 5-gallon buckets for carrying tools from job site to job site. The buckets are cheap, tough, well-balanced because of their handles (especially handy if you're climbing a ladder), and hold a lot of goodies. Now, Portable Products has come up with a means of organizing those buckets, making them even more useful.

The Bucket Boss slips onto your 5-gallon bucket and has 27 pockets for holding all your tools (11 pockets inside the bucket and 16 pockets on the outside). Because of its heavy, air-textured nylon construction, the Bucket Boss was nearly indestructible in my tests.

—Tested by Bob McFarlin

Bucket Boss, $27.45 ppd. from Portable Products. (A 10-pocket version is also available for $22.45 ppd.) Call 800-688-2677 or 612/221-0308.

Would you believe a one-minute epoxy?

We make great use of five-minute epoxy around the *WOOD®* magazine shop for several reasons. It sets up fast, requires no clamping, and creates a strong bond. So, when Devcon put a tube of their new Sure Shot one-minute epoxy into my hands at a recent trade show, I couldn't wait to get back to the shop and give it a try. True to the manufacturer's claims, the product set up in one minute and cured to full strength in one hour. A one-minute working span may be too fast for some projects, but when you're in a hurry, this stuff helps tremendously.

The product comes in a two-part, syringe-type tube that guarantees 1:1 dispensing of the resin and hardener. An attachable nozzle thoroughly mixes the two components. The nozzles are only good for one use, but you can buy extras separately.

—Tested by Bill Krier

Devcon Sure Shot one-minute epoxy, $4.99 for 1 oz., at hardware and department stores nationwide.

Super-handy featherboard

I can't say enough about the Grip-Tite magnetic feather board. The easy-to-use tool has a strong magnet that holds it securely in place on ferrous tabletops.

It has plastic springblades that exert force down toward the tabletop and against the fence. You can set it up in seconds, and move it easily from your tablesaw to your shaper table, for instance.

When I first saw the tool, I was impressed by its well-machined oak body, but skeptical about how tightly it would hold workpieces against the tables and fences of my machinery. Well, it worked just fine. (The manufacturer says the tool holds against a 20-pound horizontal push, and has over 90 pounds of vertical hold). When it came time to remove the tool, a nudge on the handle does it.

The Grip-Tite sticks to the steel legs or cabinets of your machines for easy storage. Remember, this item will not work with machines having nonferrous tabletops.

—Tested by Bob McFarlin

Grip-Tite magnetic feather board, $24.95 plus postage from Mesa Vista Design. Call 505/892-2093.

Continued on page 29

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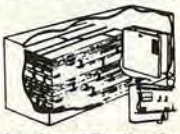
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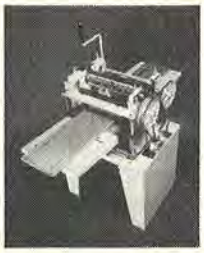
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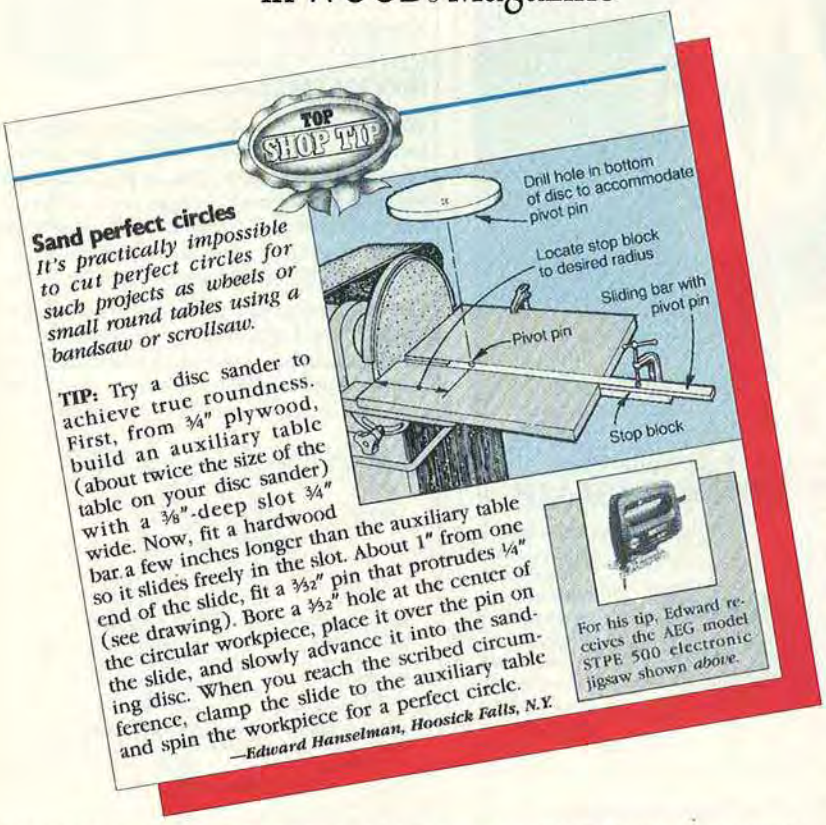
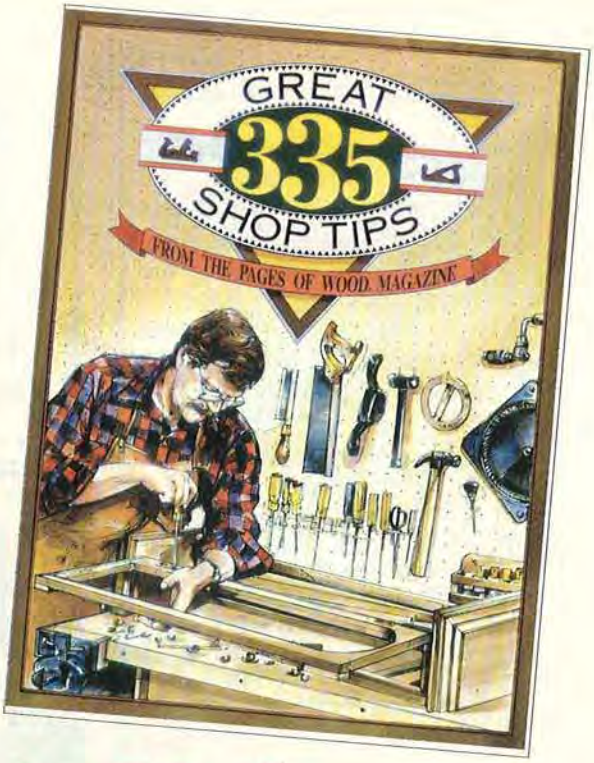

TOP SHOP TIP
Sand perfect circles
It's practically impossible to cut perfect circles for such projects as wheels or small round tables using a bandsaw or scrollsaw.
TIP: Try a disc sander to achieve true roundness. First, from ¾" plywood, build an auxiliary table (about twice the size of the table on your disc sander) with a ⅜"-deep slot ¾" wide. Now, fit a hardwood bar a few inches longer than the auxiliary table so it slides freely in the slot. About 1" from one end of the slide, fit a 3/32" pin that protrudes ¼" (see drawing). Bore a 3/32" hole at the center of the circular workpiece, place it over the pin on the slide, and slowly advance it into the sanding disc. When you reach the scribed circumference, clamp the slide to the auxiliary table and spin the workpiece for a perfect circle.
—Edward Hanselman, Hoosick Falls, N.Y.
Drill hole in bottom of disc to accommodate pivot pin
Locate stop block to desired radius
Sliding bar with pivot pin
Pivot pin
Stop block
For his tip, Edward receives the AEG model STPE 500 electronic jigsaw shown above.



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335 GREAT SHOP TIPS contains valuable information from the editors and readers of WOOD magazine. "**TIPS FROM YOUR SHOP**" is about their own woodworking experiences—shared knowledge that makes it better, faster, safer and easier to do things in the shop. You've probably used one or more of them yourself!

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335 GREAT SHOP TIPS will be available on newsstands nationwide this Spring at a $9.95 cover price. WOOD, however, offers readers the opportunity to receive **335 GREAT SHOP TIPS** at a special one-time only prepublication price of $4.95. That's more than 50% off the newsstand price! But you must order now because supplies will be limited. Just fill out the coupon and mail to: **335 GREAT SHOP TIPS, P.O. Box 11454, Des Moines, IA 50336-1454. Allow 6-8 weeks for shipping and handling.**

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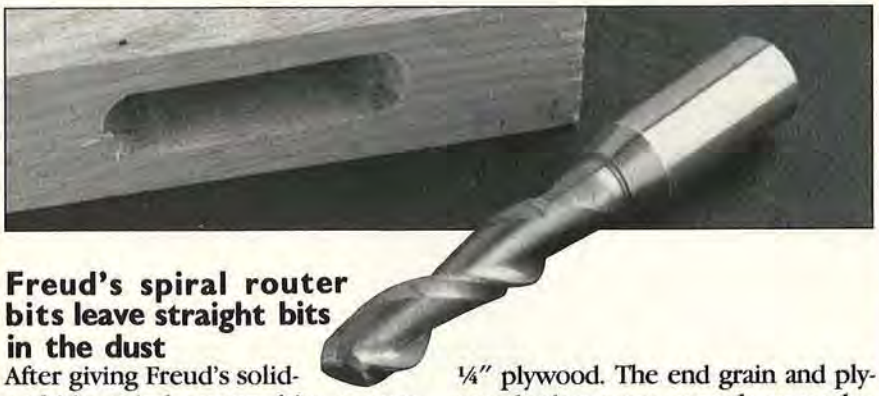
Multidiameter countersink handles many drill bits

This countersink does the work of many. It varied in diameter to tenaciously hold all my drill bits from 7/64″ to ¼″, when I tested it. Its carbide tips stay sharp for a long time. Two setscrews (one for each half of the clamshell-like tool) securely centered the bit.

—Tested by Steve Oswalt

Amana multidiameter countersink, $20.90 list price at Amana distributors nationwide. Call 800-445-0077.



Freud's spiral router bits leave straight bits in the dust

After giving Freud's solid-carbide spiral router bits a complete workout, I was thoroughly impressed. Because of their up-cut spiral shape, the bits effortlessly plunge into wood and cut far-smoother surfaces than straight bits, with no chatter, and no burning.

After routing some clean-as-a-whistle mortises, I cut several equally smooth dadoes. There's more. With my router and a few templates, I cut irregular shapes in ¾″ stock and ¼″ plywood. The end grain and plywood edges were smooth as can be.

Freud claims these solid-carbide bits will last 10 times longer than high-speed steel spiral bits. In my tests, the bits stayed sharp.

—Tested by Jim Downing

Freud solid-carbide spiral router bits, $16.40–$46.90 (list) for ⅛–½″ bits. Call Freud at 800-334-4107 for the location of your nearest dealer.

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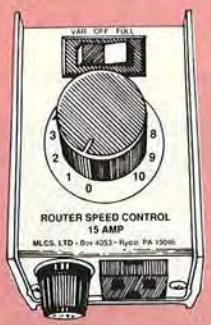

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#602		3/16" Spiral Cutter		3/16"	5/8"	1/4" *	$12.00
#603		1/4" Spiral Cutter		1/4"	3/4"	1/4"	$12.00
#903		1/4" Spiral Cutter		1/4"	3/4"	1/2" *	$12.00
#904		3/8" Spiral Cutter		3/8"	1"	1/2" *	$24.00
#905		1/2" Spiral Cutter		1/2"	1 1/2"	1/2"	$29.00
#350		1/8" Round Over	1/8" R	3/4"	3/8"	1/4"	$11.00
#351		3/16" Round Over	3/16" R	7/8"	1/2"	1/4"	$11.00
#230		1/4" Round Over	1/4" R	1"	1/2"	1/4"	$12.00
#353		5/16" Round Over	5/16" R	1 1/8"	1/2"	1/4"	$14.00
#209		3/8" Round Over	3/8" R	1 1/4"	5/8"	1/4"	$15.00
#355		1/2" Round Over	1/2" R	1 1/2"	3/4"	1/4"	$17.00
#656		3/4" Round Over	3/4" R	2"	7/8"	1/2"	$21.00
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#206		3/8" Cove	3/8" R	1 1/4"	9/16"	1/4"	$13.00
#207		1/2" Cove	1/2" R	1 1/2"	5/8"	1/4"	$14.00
#208		3/4" Cove	3/4" R	1 7/8"	3/4"	1/2"	$26.00
#460		1/4" Bull Nose	1/4" Dia. of Circle		3/8"	1/4"	$14.00
#461		3/8" Bull Nose	3/8" Dia. of Circle		3/4"	1/4"	$15.00
#462		1/2" Bull Nose	1/2" Dia. of Circle		7/8"	1/4"	$16.00
#464		3/4" Bull Nose	3/4" Dia. of Circle		1 1/8"	1/4"	$19.00
#506		1/2" Pattern	Flush Trim	1/2"	1"	1/4"	$15.00
#507		5/8" Pattern	Flush Trim	5/8"	1"	1/4"	$16.00
#508		3/4" Pattern	Flush Trim	3/4"	1"	1/4"	$17.00
#366		1/8" Slot Cutter	3/8" Deep	1 1/4"	1/8"	1/4"	$14.00
#368		1/4" Slot Cutter	3/8" Deep	1 1/4"	1/4"	1/4"	$14.00
#204		3/8" Rabbeting	3/8" Deep	1 1/4"	1/2"	1/4"	$13.00

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#211		3/8" Core Box	round nose	3/8"	3/8"	1/4"	$10.00
#212		1/2" Core Box	round nose	1/2"	11/32"	1/4"	$13.00
#418		3/4" Core Box	round nose	3/4"	5/8"	1/4"	$15.00
#213		1" Core Box	round nose	1"	3/4"	1/2"	$17.00
#214		1/4" Straight	plunge cutting	1/4"	3/4"	1/4"	$ 6.50
#215		5/16" Straight	plunge cutting	5/16"	1"	1/4"	$ 6.50
#216		3/8" Straight	plunge cutting	3/8"	1"	1/4"	$ 6.50
#217		7/16" Straight	plunge cutting	7/16"	1"	1/4"	$ 6.50
#474		1/2" Straight	plunge cutting	1/2"	1"	1/4"	$ 7.00
#775		1/2" Straight	plunge cutting	1/2"	2"	1/2"	$14.00
#218		5/8" Straight	plunge cutting	5/8"	1"	1/4"	$ 7.00
#219		3/4" Straight	plunge cutting	3/4"	1"	1/4"	$ 9.50
#220		1" Straight	plunge cutting	1"	1 1/2"	1/2"	$11.00
#500		3/8" Flush Trimming		3/8"	1/2"	1/4"	$ 7.00
#502		1/2" Flush Trimming		1/2"	1/2"	1/4"	$ 7.50
#503		1/2" Flush Trimming		1/2"	1"	1/4"	$ 8.50
#221		1/2" Flush Trimming		1/2"	1 3/16"	1/2"	$ 8.00
#545		Tongue & Groove	Straight	1 5/8"	1"	1/4"	$29.00
#845		Tongue & Groove	Straight	1 5/8"	1"	1/2"	$29.00
#546		Tongue & Groove	Wedge	1 3/16"	1"	1/4"	$29.00
#846		Tongue & Groove	Wedge	1 5/8"	1"	1/2"	$29.00
#450		1/8" Beading	1/8" R	3/4"	3/8"	1/4"	$11.00
#451		3/16" Beading	3/16" R	7/8"	1/2"	1/4"	$11.00
#233		1/4" Beading	1/4" R	1"	1/2"	1/4"	$13.00
#453		5/16" Beading	5/16" R	1 1/8"	1/2"	1/4"	$14.00
#454		3/8" Beading	3/8" R	1 1/4"	5/8"	1/4"	$15.50
#455		1/2" Beading	1/2" R	1 1/2"	3/4"	1/4"	$17.00
#530		3/16" Edge Beading	3/16" Dia. of Circle		1/2"	1/4"	$15.00
#531		5/16" Edge Beading	5/16" Dia. of Circle		1/2"	1/4"	$15.50

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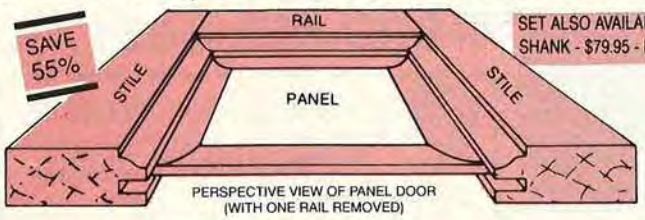

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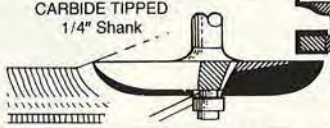

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Honduras MAHOGANY

The classic choice in tropical timber

The first mahogany to reach England was in the shape of ships—those of the Spanish Armada that later succumbed to the English fleet's cannonballs. That was in 1588, more than 30 years after the Spanish explorer Hernando Cortes discovered mahogany in the Caribbean.

Although English shipbuilders marveled at the new seagoing stock, it was the joiners who really appreciated this New World treasure. They could span greater lengths and widths than with any other wood available, due to the sheer size of the mahogany timbers.

By the late 1700s, the now-famous English cabinetmakers Chippendale, Hepplewhite, and Sheraton were shaping mahogany into classic furniture styles that kept the wood prominent for 150 years. Today's woodworker still finds delight in working mahogany into elegant cabinets, desks, tables, and other furniture.

Wood identification

Often referred to in the wood trade as Tropical American mahogany, Honduras mahogany (*Swietenia macrophylla*) grows throughout much of Central and South America, including southern Mexico. However, the first mahogany discovered by Spanish explorers was Cuban mahogany (*Swietenia mahagoni*), a species no longer commercially available. Another true mahogany exists in Africa—African mahogany (*Khaya ivorensis*). Philippine mahogany isn't a mahogany at all, but rather a *Shorea* species called lauan.

In the tropical forest, Honduras mahogany sometimes attains 150′ heights and diameters of 72″. Trees planted and grown for lumber on plantations (found in mahogany's natural range and the South Pacific), run smaller. Honduras mahogany on the stump has a heavily buttressed trunk base, scaly gray bark, and leaves displaying six to eight leaflets arranged on a single stem, much like those of the black walnut tree.

Honduras mahogany wood has straight, semi-open grain and a color that ranges from yellow-brown to dark red, depending on where it grows. With age, though, mahogany of all colors becomes a rich, dark red-brown. The wood also may display exceptional fiddleback, quilt, and ribbon-stripe figure.

Natural range

A bit lighter than maple at 32 pounds per cubic foot, Honduras mahogany matches oak in strength. The wood also withstands moisture, resists fire and decay, and remains stable in use.

Uses in woodworking

Mahogany claims the qualities that make it the ideal stock for majestic desks, tables, and large cabinets. Both turners and carvers find the wood suited for intricately detailed work. And, today's boatbuilders, like those centuries ago, turn to Honduras mahogany for structural members, decking, and trim.

Availability

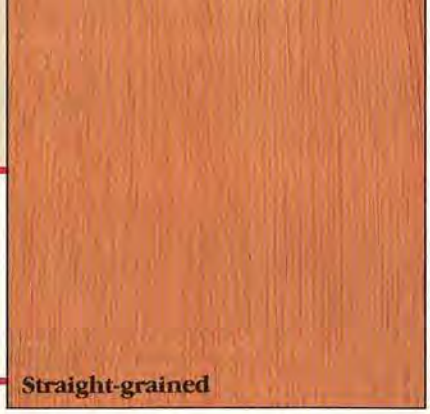
Due to the tree's size, Honduras mahogany boards usually run wide and long. Expect to pay about $4 per board foot. Veneer offers the widest range of figure, but it will cost you $1 to $3 per square foot.

Continued

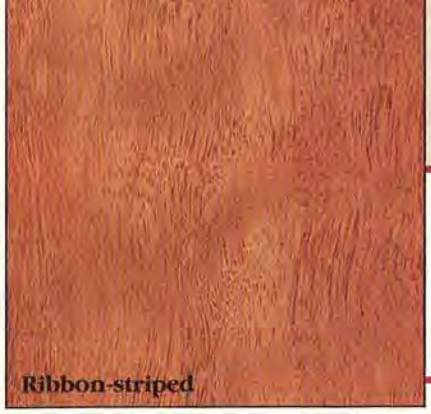
PERFORMANCE PROFILE

Honduras mahogany

(Swietenia macrophylla)



Straight-grained



Ribbon-striped

Machining methods

Paul McClure, *WOOD®* magazine's consultant on wood technology, calls Honduras mahogany "the wood by which all other woods are measured." By that, he means you couldn't ask for a better wood to work. And, all the craftsmen we asked agree with him. *So, note our advice, and enjoy this singular stock:*

- We don't know exactly why, but Honduras mahogany produces extremely fine dust during some machining operations. And, the dust hangs in the air longer than that of other woods. So, wear a respirator.
- Because of this mahogany's hardness and straight grain, it surfaces with minimal tearout. The wood even proves forgiving if you accidentally feed it into the jointer against the grain. Sharp knives leave nearly glass-smooth results free of mill marks. Feed figured stock into a planer slowly and at a slight angle. Otherwise, the wood grain may chip and tear on you.
- You can rip Honduras mahogany equally well with steel or carbide-tipped blades. However, blades with more than 28 teeth increase the chance of burning.
- Don't take chances on the wood splintering while crosscutting. With a handsaw or power tools, always use a fence or backing board as a chip breaker on the exit side.
- Honduras mahogany cuts beautifully with a jigsaw or scrollsaw.
- Rout this wood with sharp bits (and don't forget the dust mask) for mark-free results. The grain "frizzes" with dull bits.
- You won't have problems joining Honduras mahogany, as all types of glue work well.
- Although the wood easily sands smooth, filling its open grain results in the sleekest surface.
- Choose any type of stain or finish for your Honduras mahogany project because the wood accepts them all equally. For outdoor projects, rely on a spar varnish or exterior polyurethane. It also takes and holds paint exceptionally well, but you'll need a primer coat and several top coats to completely fill the wood's open grain.

Carving cautions

- Honduras mahogany became *the* wood for classic furniture because it was great to carve with knives and gouges and took detail. That holds true today. Power carvers should, however, adopt a light touch because motorized bits can get overly aggressive.

Turning tips

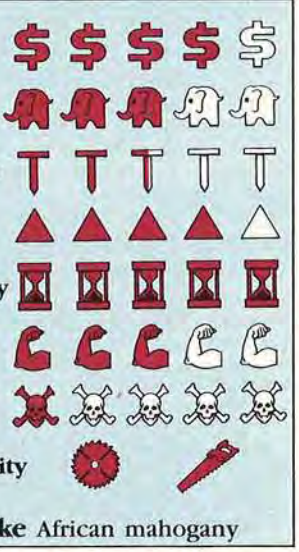
- To avoid chipping, round down Honduras mahogany with a ¾" gouge at 800–1,000 rpm.
- Turn off the lathe for final sanding, and sand with the grain.
- Don't apply finish to spinning wood because the open grain of Honduras mahogany momentarily collects the material. Then, as it spins, the finishing material flows from the grain to form what looks like wrinkles.

SHOP-TESTED TECHNIQUES THAT ALWAYS WORK

Any exceptions, and special tips pertaining to this issue's featured wood species, appear under headings elsewhere on this page.

- For stability in use, always work wood with a maximum moisture content of 8 percent.
- Feed straight-grained wood into planer knives at a 90° angle. To avoid tearing, feed wood with figured or twisted grain at a slight angle (about 15°), and take shallow cuts of about 1/32".
- For clean cuts, rip with a rip-profile blade with 24–32 teeth. Smooth cross-cutting requires at least a 40-tooth blade.
- Avoid drilling with twist drills. They tend to wander and cause breakout. Use a backing board under the workpiece.
- Drill pilot holes for screws.
- Rout with sharp, preferably carbide-tipped, bits and take shallow passes to avoid burning.
- Carving hardwoods generally means shallow gouge bevels—15° to 20°—and shallow cuts.

MAHOGANY AT A GLANCE



Look-Alike African mahogany

Compiled with woodworkers Jim Boelling, Jim Downing, Robert St. Pierre, carver Jim Rose, and turner Gary Zeff. Illustrations: Steve Schindler

PETER WOLF TOTH AND HIS TRAIL OF WHISPERING GIANTS

Print this article

Somewhere, sometime during the last 20 years, you may have spotted the work of Peter Wolf Toth. After all, his massive carvings *are* hard to miss. And once seen, they become etched in your mind.

During the last two decades, the 42-year-old, Hungarian-born sculptor has donated a trail of massive monuments across the continental United States, Alaska, and Hawaii. His tree-sized busts of American Indians number more than 60—at least one in every state. Carved from Douglas fir, oak, cottonwood, Ponderosa pine—whatever happened to be on hand—they represent what Peter calls "The Trail of Whispering Giants."

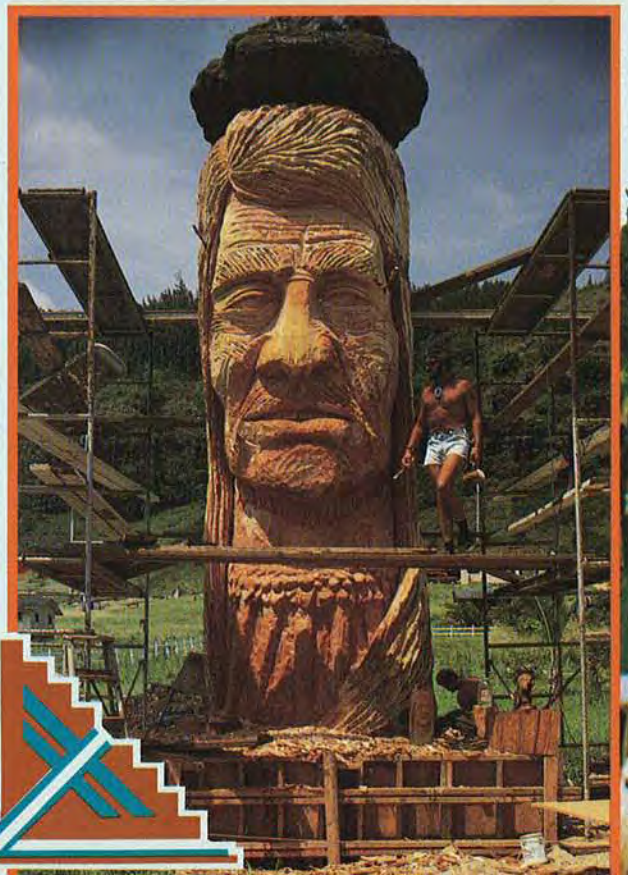
A message to America

"All that happened to me early in life led me to making these statues," explains Peter, in a pause from his work on the upright red-oak carving. In a few weeks it will command public attention in Williamsport, Pennsylvania's Brandon Park, honoring the area's Delaware, Iroquois, Susquehanna, Erie and other Pennsylvania Indian people.

Continued

In celebration of the region's Alabama-Coushatta people, Peter carved a red-oak statue in an Interstate 30 rest area outside Texarkana, Texas. Tribal members in their feathered bonnets and other ceremonial finery gather at the statue's dedication.

Peter Toth completes details on his tribute to the native Hawaiians. Carved in 1988, the Douglas-fir sculpture stands 30′ tall and measures 6′ in diameter. It's located along King Kamehameha Highway, on the island of Oahu's north shore.



GIANTS

"My family lost their land in Hungary. It was stolen from them by the Russian Communists—twice. We were refugees in our own land, our own country. I feel that the American Indians were refugees, too, in their own land.

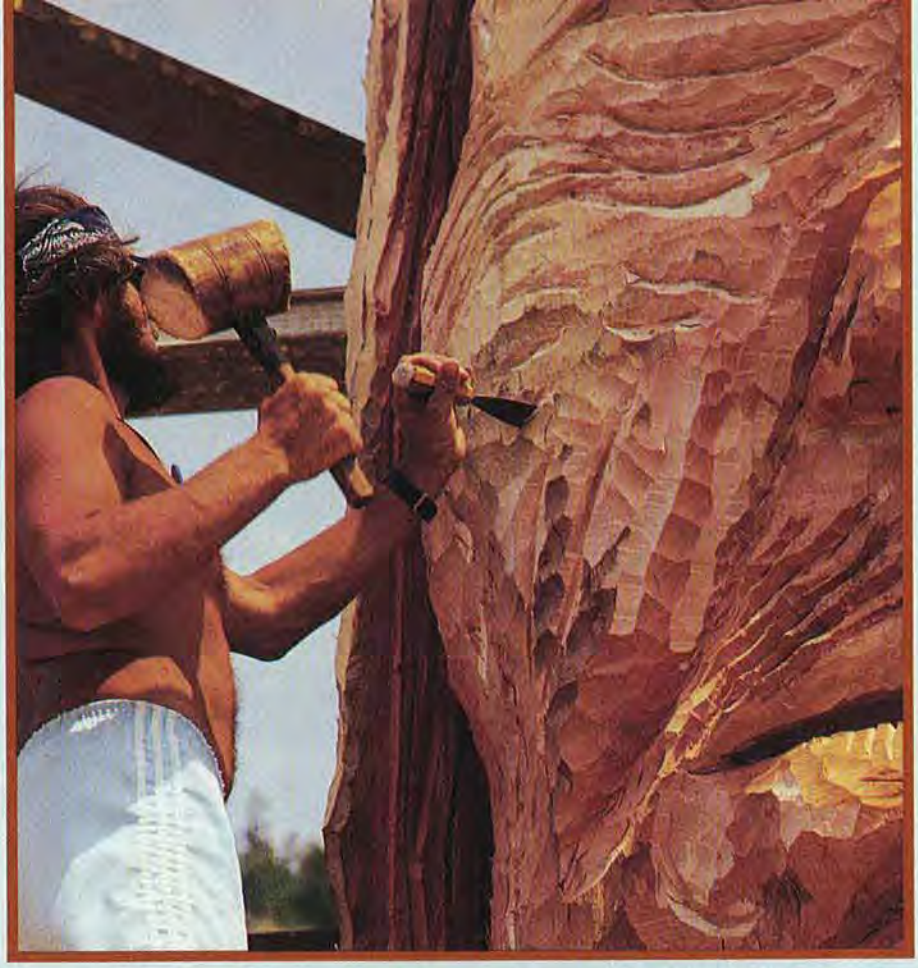
"As the Europeans moved westward in this country, the Indians were driven to the interior," he continues. "Eventually, they were shuffled onto reservations, often worthless land, like in Oklahoma. And, you see, this is what happened to us also. That's why I relate to the American Indians, and to their oppression."

Peter and his family escaped war-torn Hungary of the 1950s and fled first to Yugoslavia, then to Austria and Germany before immigrating to the United States in 1958. He was 10 years old when they arrived in Akron, Ohio. And, like any youngster, Peter found heroes in his new land.

"When I was growing up, my heroes were unlike those of other kids," he remembers. "They weren't cowboys, but rather Indians, and specific ones—the Nez Perce's Chief Joseph, Sitting Bull, Chief Crazy Horse, Chief Red Cloud, and others I respected."

One of his more contemporary heroes was John F. Kennedy. "He made the statement 'We should not ask what our country can do for us, but rather what we can do for our country.' By making my statues, I think I am trying to live that—giving a gift of myself to my country in thanks for my freedom. And, with the statues, I bring some attention to the past and present difficulties of the Native American.

"We have such a great, beautiful, and wealthy nation," Peter adds. "Yet, our first people, the ones that are most deserving, are oftentimes living in dire poverty. I have been among them, lived, and taught school. I have seen the poverty. In fact, it was one of my Indian friends who named my series of statues. He mentioned that they looked like giants whispering, perhaps about the plight of the Indian people."



Standing high in the scaffolding, the carver takes off wood with a chisel and mallet. Although Peter owns a chain saw, it's only used for some large undercuts. He does much of the roughing-out with the log on the ground.

Peter's 40th sculpture, *right,* in Valdez, honors Alaska's native American Aleut, Eskimo, Tlingit, Haida, Tsimshian, and other tribes. It's carved from Sitka spruce, the area's most abundant tree.

Trees along the trail

Peter doesn't claim any formal training in carving or art. His father, however, was a carver, albeit a part-time one.

"I used to watch my father, and most of my ability comes from him, I suppose," he says. "He created a number of carved objects, but he couldn't pursue it as I am able to because he had 11 kids to raise and had to work steady. When I started out, I didn't have any responsibilities except to accomplish a dream. During those five years, I was prepared to live on bread and beans."

Since 1971 Peter has traveled the United States, carving his tributes to the American Indian in tall timber at no charge. But his work actually began with a face he saw in the rock.

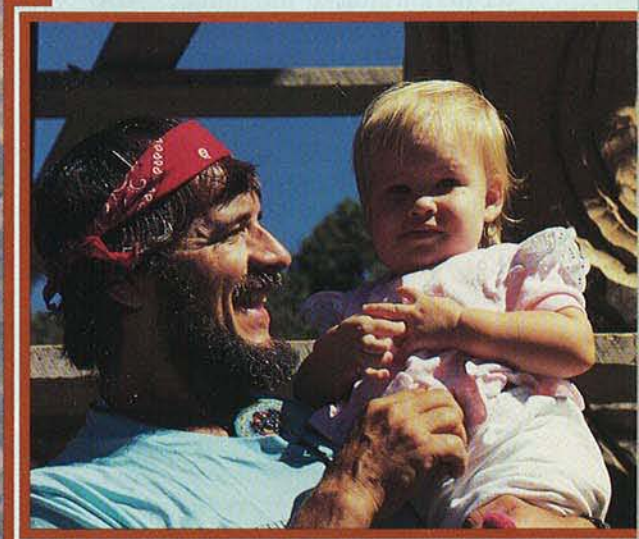
"It was before I was married and I was visiting La Jolla, California," Peter recalls. "I had known for a long time that I wanted to do something for the Indians, but I was unsure of what. Then, on a cliff by the beach, I saw an image of an Indian in the rock. So, I started chiseling away and made the first tribute there. After that, I decided to do more, but in easily accessible areas and with wood.

"The wood I use is not chosen because it is hard or soft, but because it's available," says Peter. "I try to get the best possible wood for the area."

In Hawaii, finding an appropriate tree proved impossible. Koa would have been suitable, but on the island of Oahu it was protected, and the trees were too small in dimension. "I absolutely had to

have a tree that was of great diameter," says Peter, "simply because the Hawaiian people have broad faces. They are big people, and to diminish their appearance would be to portray them incorrectly [see photo, *opening page*]."

He solved the problem by importing a large Douglas fir from Oregon. "It was donated, which is often the case, and a friend contributed the shipping. Sometimes, I use my own money for shipping, but fortunately that is not the case in most instances. I am very blessed as far as the communities coming up with the material help that I need."



Peter takes a break from his carving to hug his daughter Mendocino, who with his wife, Kathy, accompanies him on the road.

Even after 20 years of carving in many kinds of wood, Peter hasn't developed a fondness for a specific species. His major concern is durability. "I look for the best possible wood, even though it's often the toughest to work. Then, I seal the statue with a preservative, and add sometimes 100 coats of an exterior urethane varnish," he comments. "A wooden statue should last beyond my lifetime if it is protected from termites and ants, standing water, and other things that cause decay. Maybe some year down the road aways I can tell you which wood is the

Continued

most durable, but for the time being, it's too early to tell."

Sculpture on a grand scale

Some carvers work from patterns. For Peter, of course, that's impossible. After considerable study of an area's Indian people, his imagination decides the design for his hands to execute.

"Visualization is the most important aspect of carving my statues," Peter says. "I work so close up against them that I have to stand back every so often to see where I'm going."

Because Peter works within the shape of his material, he must alter his carving to the timber. "The log often is very tall and the surface narrow, so there is a certain amount of abstraction required," he says. "Proportion is the first rule of thumb in sculpting—you must divide the anatomy of a human being into balancing parts. But I can't worry too much about that." As a result, viewers frequently equate Peter's statues with totem poles, a comparison he dismisses.

"I honor the American Indian's art, but I don't copy it," he says assuredly. "My statues represent the physical images of the Native Americans as I perceive them to be. And my work is always a composite of the Indian people in a state or region."

At Williamsport, Peter's three-dimensional interpretation began on the 35′-long oak as it lay on the ground. After three months, he supervised the crane and crew who lifted it into place, as shown *opposite page*. Next came the scaffolding that enables him to work the carving round and add detail with his mallet, chisels, and occasionally a small chainsaw.

"Many people think of my work as chainsaw sculpture," he notes, amusement creeping into his voice. "But 90 percent of it is done with hammer and chisel."

A glance into the muscular carver's tool box reveals

more than 100 chisels, from 1″ wide for detail work to 4″ for roughing. There's an 8-pound hammer to team up with the largest chisel, a smaller, lighter hammer, and a 2-pound wooden mallet, too. "Of all those chisels," says Peter, "the 4″ gets the most use on the wood."

Passing the blanket

All told, Peter, his wife, and young daughter spent nearly five months at the Williamsport site while he worked on his latest whispering giant. Their home on the road was—as it has always been—a 29′ trailer pulled by a pickup. Except for a recently purchased Illinois home and the responsibilities of fatherhood, little has changed for Peter in 20 years.

Kathy, Peter's wife, and Caesar pose at the base of a statue carved in Paducah, Kentucky. The headdress represents a compilation of styles worn by the region's Native Americans.

In Williamsport, Pennsylvania's Brandon Park, a crane lifts Peter's latest statue into place. From first cut to dedication, Peter spent nearly five months at the location.

"I charge nothing for my work," he explains. "We get by through the sales of my book [see box, *below*). I also sell some postcards of the statues, and I sell some of my smaller carved pieces. However, we are not in poverty. We just don't live high on the hog, and we have to watch our money. All in all, we have been very fortunate because everything seems to fall into place, so our worries are perhaps less than those of other people."

Read about Peter's travels
To see all the carvings and read more about Peter's travels on the Trail of Whispering Giants, order your autographed copy of his 250-page book, *Indian Giver* ($13.95 ppd.), from: Peter Wolf Toth, Rt. 2, Box 599, Cable, WI 54821.

And Peter has satisfaction, too, in knowing that his Trail of Whispering Giants and their message hasn't gone unnoticed, especially among native Americans. To recognize his efforts, North Carolina's Cherokee tribe made him an honorary member. In acceptance, Peter took the name "Wolf." A Florida Seminole chief equated the importance of his work to that of Michaelangelo. But all recognition pales in comparison to the grass-roots support he receives.

"In 1980, when I was going up to Alaska after finishing my statue in Mandan, North Dakota, I was invited to visit the Standing Rock Reservation of the Sioux, near Bismark," Peter recalls. "That's the tribe of many of my boyhood heroes, such as Sitting Bull.

"Anyway, I attended a powwow there, and after it, the Sioux passed a blanket around and threw money in. That was their way of honoring me. Some people threw in coins, others threw bills, all in my behalf. The money was to help pay my way to do a carving in Valdez. And a lot of the Sioux Indian people were obviously more in need than I, but it would have been dishonorable not to accept their support."

Written by Peter J. Stephano
Photographs: John Troisi; Peter Toth

CARVE THIS MOMENTO OF TURN-OF-THE-CENTURY AMERICA

TABLETOP CIGAR-STORE INDIAN

AN IMAGE WORTH 1,000 WORDS

In the days before public education was guaranteed, many people couldn't read and write. So, to sell their goods and services, merchants and professionals put carved displays and symbolic signs outside their shops and offices to denote what they offered. An optometrist, for example, might hang a large pair of carved eyeglasses; a cobbler a boot; a tavernkeeper a tankard; a dentist a tooth, and so on.

But none of these "shop figures," as collectors call them, has become more recognizable and sought after than the tobacco- or cigar-store Indian. And the account of how the Indian became such a well-known symbol is an interesting tale.

It's said that Sir Walter Raleigh introduced tobacco grown and smoked by the Indians in the Virginia Colony to England in the early 1600s. The popular product became known as "Indian weed" and storekeepers specialized in its sale. However, to cleverly promote tobacco posed a problem—at least until a pioneer advertising genius thought to associate an Indian figure with the puffable leaf.

As the story goes, few people in England at the time knew what a New-World Indian actually looked like. News from Virginia, though, did tell them that some of the colonists employed black slaves to tend the crops. So, it's said that the first tobacco-store Indian was a black man wearing a feathered headdress and a kilt of tobacco leaves!

It took about 100 years for the carved figure we recognize as a cigar-store Indian to appear in the American colonies. But from 1840 to 1900 (when they began to be replaced by metal signs) the cigar-store Indian was everywhere. It has been estimated that at the turn of the century there were 100,000 of them in use. Fifty years later, the number had dropped to 3,000, and today wooden cigar-store Indians are rare.

Print this article

Traditional cigar-store Indian figures were most often life-sized. The one on these pages, however, measures just 19½" tall—a size adaptable to many display possibilities.

Carver Mike Krone of Branson, Missouri, designed this version. In addition to size, he deviated from the traditional by "westernizing" the clothes and headdress to depict clothing worn by the Plains Indians. "This tends to create a more striking carving," notes Mike, who formerly carved nothing but western figures. He now focuses on carvings of animals and sports figures as an associate of Mountain Woodcarvers, a noted Branson woodcarving shop.

YOU'LL NEED THESE TOOLS AND SUPPLIES

The cigar-store Indian requires a 4¾ × 3¾ × 19½" block of basswood or other carving wood. You can, though, get a quicker start by ordering the 70-percent complete, precarved roughout shown *left*. Send $19.50 (U.S.) ppd. each, or $35 for two, to: Indian, Mountain Woodcarvers, Drawer R, Branson, MO 65616. Allow 4 weeks for delivery.

As a minimum, you'll need the carving tools illustrated *below*:

Knife

- bench-type carving knife

Gouges

- ½" No. 3 gouge
- ⅛–3⁄16" 45° V-tool

Finishing materials

For finishing, you should have:

- 80–120-grit sandpaper
- Water-soluble, acrylic artist's paints in white, red, blue, orange, brown, and yellow
- No. 7 or No. 8 brush
- No. 000 brush
- Boiled linseed oil
- Burnt-umber artist's oil color (or walnut oil stain)

Define your carving

If you have ordered the roughed-out carving, skip down to the next paragraph. If you're starting from scratch, first enlarge the front and side view patterns given on *page 41* to full-size, then trace them on your carving block. Next, bandsaw the block to shape.

Because of the figure's size, it's easy to hold for carving with palm-sized tools by bracing against your thigh. But, the rectangular base also lends itself to clamping in place should you have larger carving tools.

With your knife or a gouge, begin at the base and take off excess wood until you achieve the Indian's rough shape. On a precarved roughout, start surfacing (removing the machining marks) with a knife or gouge. Work on the legs, torso (leave the hands alone for the time being), and arms first, then move to the base.

There, as shown *below,* use your gouge to do the surfacing, and carve deeply enough to shape the feet and give them thickness (about ½" will do).

Begin surfacing your figure at the base with a No. 3 gouge. Outline the moccasined feet, then define them.

Now, following the principle that you should work from less-detailed areas to more-detailed areas in order to familiarize yourself with the tools and the wood, work from the feet up to the figure's neck. Carve wood away to define (outline) parts such as the moccasins, the legs, the arms (not hands), braids, and neck with stop cuts from your knife and slices from the gouge.

When you complete defining, go back and carve in details such as fringe and hair with your V-tool. (Novice carvers should save carving the fringe detail around the hand areas until the hands have been shaped.)

Shape the hands from mittens

To carve the left hand with your knife or gouge, don't launch into the fingers right away. Instead, consider the hand's general shape and where the fingers and thumb originate by studying your own hand. You'll notice that the thumb begins down on the side of the hand, as shown in the photo *below,* but not exactly where the fingers do.

Here's an easy way to carve the hand: First draw a mitten on the wood, then carve it. Next, take your pencil and divide the finger

To carve a hand, first draw and shape a mitten, then divide the mitten into fingers with cuts of your V-tool.

Continued

CIGAR-STORE INDIAN

portion of the mitten into separate fingers, noting the different length of each. With your V-tool, carve the fingers, as shown in the photo on *page 39, bottom right.*

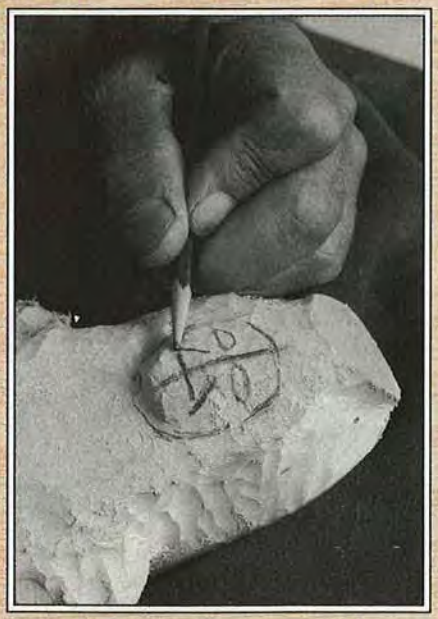
Now, start on the right hand, remembering that it, too, should begin as a mitten, but one that surrounds and supports the cigars, as shown *below.* After you have carved the fingers, use your V-tool to make the cigars appear bundled by a ribbon. A simple crosshatch pattern outlines the top of the cigar bundle.

The right hand holds and supports the cigars. Define individual cigars and the band around them with a V-tool.

The challenge of the head and headdress

Carving the face will be the most critical aspect of your cigar-store Indian. To get a realistic one, you must adhere to the facial characteristics of the American Indian, as shown in the closeup photo of the painted figure, *right.* The nose, for example, should be large and slightly hooked. Carve the cheekbones set wide apart. And make the lips full and rounded, but not overly prominent.

To start the face, pencil it on the wood, as in the photo, *above center.* First, draw a broad oval divided by a vertical center line (this helps you keep the face symmetrical). Next, draw the eyes, noting that they should be widely spaced (about one eye-width apart) and about two-thirds of the way up the face.



Draw a large oval on the wood for the face, then divide it with a vertical line to help you keep features in balance. Redraw the lines as necessary.

Draw the smile lines of the mouth with two lines forming the legs of the letter *A.* Begin the lines at the nostrils and run them downward and outward to nearly intersect with the horizontal line of the mouth that falls between the tip of the chin and the tip of the nose. Remember that on the average human face, the width of the mouth equals the distance between the pupils of the eyes.

Now, use your knife and gouges to shape facial features, as in the photo, *below.* As you carve, lightly redraw the vanishing pencil lines.

Study the facial features closely. Note that the smile lines come down from the nose like the legs of the letter A.

Refer to the closeup photo of the painted head and the rear view to carve and detail the headdress. Note that the feathers taper out from the head to a thickness of about 3/16". Define the feather outlines, and the quill and barb of each feather, with your V-tool. (See how the feathers appear in the photo of the finished face.)

Complete your carving at the base

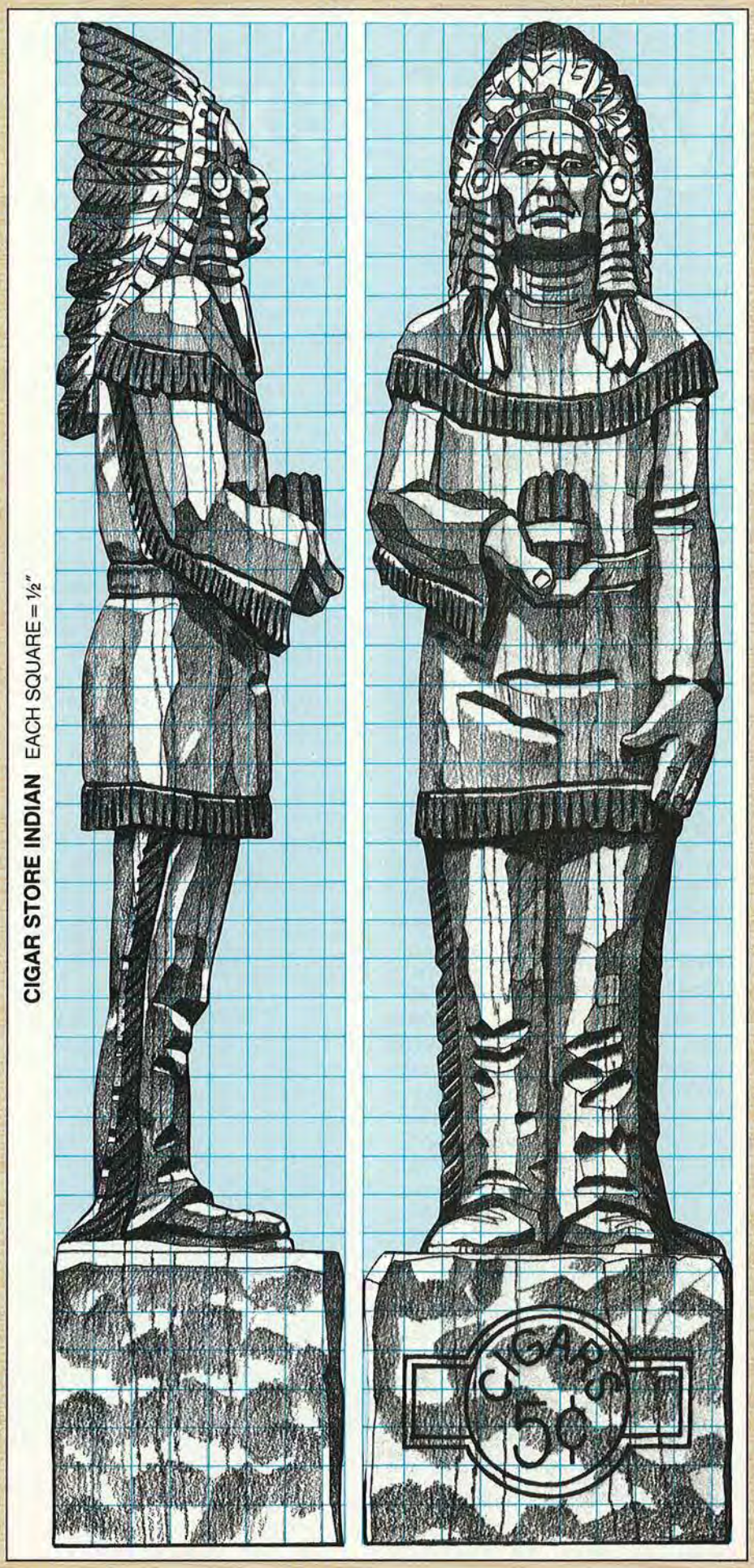
Return now to the base of the figure and touch up any rough surfaces you might have missed. Then, draw to size on a piece of paper the logo shown on the base in the opening photograph. With carbon paper, transfer your logo to the front of the base. Carve it with your V-tool (woodburning the design on the base also would be a nice touch).

To complete the carving, use your gouge or knife to add a few wrinkles to the figure's clothing. Generally, wrinkles appear inside the elbows, on the lower front of the shirt, and at the knees, as you can see in the front view of the completed figure.

Now, add the color

For the Indian's buckskin breeches and shirt, thin the paint so that it acts as a stain and lets the grain show through. Use a simialr thinned-down mixture on the face, also. For accent, the fringe should be colored with full-strength paint (or use a woodburner to darken it before painting). The headdress, braid trappings, and cigar wrapping all require soild, unthinned paint.

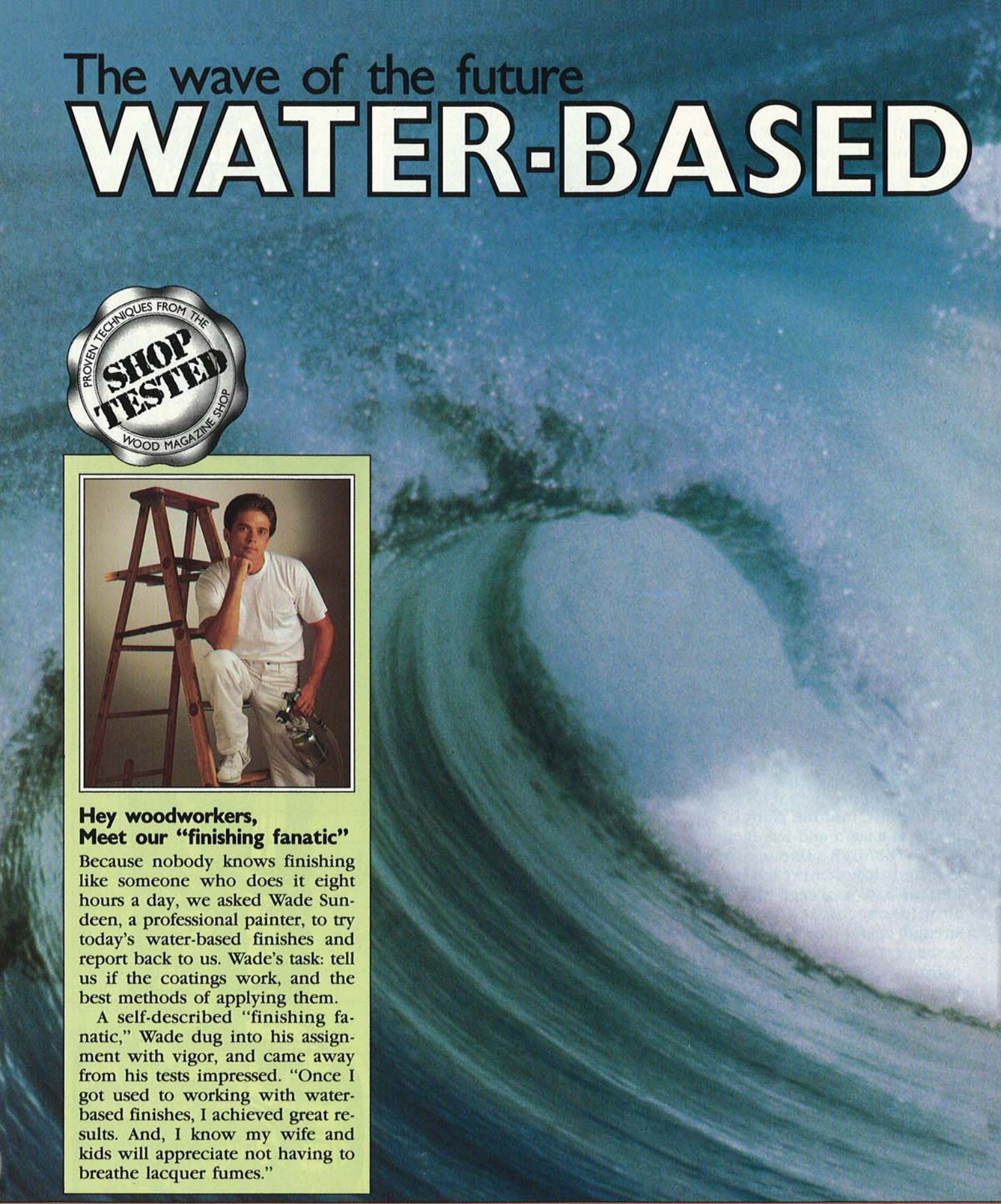
To give your cigar-store Indian an antique look, add a small amount of burnt umber artist's oil color (or walnut oil stain) to boiled linseed oil, then coat the figure. Be sure to first test your antiquing mixture on a piece of scrap wood.



Written by Peter J. Stephano with Mike Krone and Harley J. Refsal
Photographs: Hopkins Associates; John Hetherington

The wave of the future

WATER-BASED



PROVEN TECHNIQUES FROM THE SHOP TESTED WOOD MAGAZINE SHOP

Hey woodworkers, Meet our "finishing fanatic"

Because nobody knows finishing like someone who does it eight hours a day, we asked Wade Sundeen, a professional painter, to try today's water-based finishes and report back to us. Wade's task: tell us if the coatings work, and the best methods of applying them.

A self-described "finishing fanatic," Wade dug into his assignment with vigor, and came away from his tests impressed. "Once I got used to working with water-based finishes, I achieved great results. And, I know my wife and kids will appreciate not having to breathe lacquer fumes."

They're fast and environmentally

FINISHES

THE ENVIRONMENT IT'S ALL WE HAVE

You say you don't know the first thing about water-based finishes? Well, you're not alone. Until recently, very few people other than professional floor finishers were aware of the easy water cleanup, low odor, clarity, and fast-drying nature of these finishes. That, coupled with two notable drawbacks—grain-raising and high cost—kept them out of the hands of most home woodworkers. But today, with improvements in the performance and availability of these finishes, and governmental pressure for environmentally friendly coatings, water-based finishes have officially "arrived" for home woodworkers.

In light of these happenings, we decided the time was right for us to take a close look at today's water-based finishes. So, we rounded up most of the major brands and tried them out. Now we're ready to tell you what to expect with these products, and how to make them work for you.

HOW WATER-BASED FINISHES WORK

What makes water-based finishes so different from the solvent-based products you're used to? Two things actually. The first has to do with the makeup of the finishes. Solvent-based finishes contain anywhere from 50 to 80 percent solvents (often referred to as petroleum distillates or mineral spirits) and 20 to 50 percent solids. Solids are the ingredients left on the wood after the solvents evaporate. Water-based finishes, on the other hand, contain more than 60 percent water, about 30 to 40 percent solids, and only 3 to 10 percent solvents. So, when a water-based finish dries, mostly water—and only a small amount of environment-damaging solvents—goes into the air.

The other thing you need to know about water-based finishes is that they dry transparent. The reason: These products don't contain linseed, tung, or other oils that typically give solvent-based coatings an amber coloring as shown *above*. If you want to achieve this warm, yellow look with water-based finishes, you need to stain the surface with light-amber stains.

We finished a red-oak board with a water-based coating (*left*) and an oil-based polyurethane (*right*). Note that the water-based finish left a transparent film on the board surface.

As we found out at an early stage in our research, manufacturers label many water-based products as either *polyurethanes* or *lacquers,* even though the finishes bear little resemblance to solvent-based polyurethanes or nitrocellulose lacquers. Some companies, such as Flecto and Basic Coatings, simply refer to water-based products as *coatings* or *finishes.*

Amity sells both "lacquer" and "polyurethane" water-based finishes. Randy Reek of Amity explains their labeling this way: "We use the terms lacquer and polyurethane so customers can relate to the products they are replacing. Like solvent-based polyurethanes, our water-based polyurethanes contain urethane, provide a tough finish, and cost a little more than our lacquers." A gallon of Amity's lacquer retails for $25, while an equal volume of polyurethane costs $35. A quart of lacquer sells for $10.95.

What's behind the move to water-based finishes

Ever since major California air districts limited volatile organic compounds (VOC) in finishing products during the 1960s, manufacturers have researched low VOC coatings.

Today, 35 states have strict requirements for VOC control.

Continued

friendly. Give 'em a try!

WATER-BASED FINISHES

Manufacturers can meet these requirements in one of two ways: Either reduce the level of solvents in their solvent-based finishes, or switch to water-based finishes. Today, manufacturers follow both routes, but most of the company representatives we spoke to felt that only water-based finishes hold the key to meeting ever-tightening VOC regulations.

Our assessment: How the finishes performed

After trying all of the water-based finishes on a variety of projects, we've decided to use these products in the *WOOD®* magazine shop whenever practical. But, we're not ready to entirely drop solvent-based finishes from our shop, yet. Why? On many projects, especially intricate ones, we'll still use lacquers and polyurethanes to completely seal the wood grain before applying a water-based finish.

To make a personal decision, you need to weigh the advantages and disadvantages against your own needs. To help you out, we've come up with the report card at *right*. If you decide to make the switch to water-based finishes, give yourself a little time to get used to these products, and put in some practice on scrapwood before tackling an actual project. And, don't forget to take the same safety precautions with these products that you would with solvent-based finishes. Once dry, these finishes burn every bit as well as the residues of solvent-based products.

R·E·P·O·R·T C·A·R·D

WATER-BASED FINISHES

Subject	Grade	Comments
Clarity	A	Absolutely clear. Great if you want a transparent finish. Not so great if you want a warm glow in the wood.
Cleanup	A+	Enough said.
Cost	E	Expensive—costs nearly twice as much as oil-based finishes.
Drying Speed	A	Fast. Sometimes too fast.
Grain Raising	D	Lots of room for improvement here.
Hardness	A	Finish can be rubbed out and polished after drying for one day.
Odor	A	Little odor.
Bubbling	C	Harder to control than most solvent-based finishes.

Signature Bill Krier

10 STEPS TO A SUCCESSFUL WATER-BASED FINISH

Before starting our tests, we gathered samples from nine manufacturers including the suppliers of the five products shown *below*.

We also tested finishes from Basic Coatings (Professional Image finishes), Hydrocote, Minuteman Furniture Restoration Systems, and Wood-Kote. All of the coatings performed acceptably. Amity and Hydrocote have the widest ranges of products, including stains, fillers, sanding sealers, and rubbing compounds. At this point, only Hydrocote produces exterior- and marine-grade water-based finishes.

After two months of testing, we've developed a series of application steps to guide you. We worked mostly with red oak because its open grain structure poses more challenges to the water-based finisher than tighter-grained woods such as walnut or cherry. Here's how to go about it:

1 Get the right product. Some finishes are formulated exclusively for spraying, so look for a product intended for brushing if you don't have a spray gun. The brushable coatings have flow-out and debubbling agents not found in the spray-only finishes. For a list of manufacturers and their phone numbers, see page 47. Remember to carefully read the application instructions.

2 Stir the finish. This disperses the leveling, debubbling, and flow agents that help the finish

Apply a thin film of water with a sponge or rag to raise the grain.

perform as well as possible. Don't shake the container—you'll just create more bubbles.

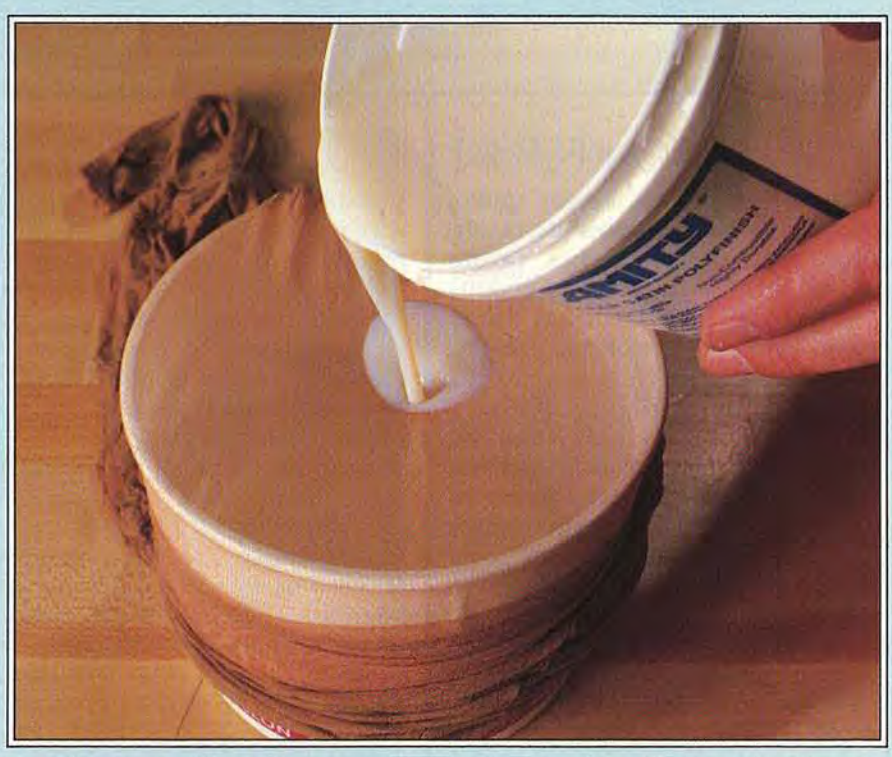
3 Wet the wood surface. To help you deal with the tendency of water-based finishes to raise wood grain, wet the wood with plain water as shown *below left* before you put together the project. This way, you can sand the pieces as described in the next step without manipulating the sandpaper into tight spots created by assembly. A sponge or rag works well, but remember to apply just enough water to raise the grain without soaking the surface.

4 Sand the raised grain. With a finish sander or hand block, smooth the surface with a succession of 150- and 220-grit sandpapers as shown at *right*. Thoroughly clean all sanding dust from the surface with an air hose or vacuum. Don't use a tack cloth—it may contain waxes or oils not compatible with water-based finishes.

5 If desired, stain the surface. Even after following the above steps, a water-based stain or finish will still raise the grain, especially on open-grained woods. This increases your odds of sanding off the stain when smoothing successive finish coats. So, if your test pieces reveal a problem here, we suggest you stick to oil-based stains. Several manufacturers, including Deft and Flecto, produce oil-based stains that clean up with water and release negligible odor. These stains will seal the surface partially, reducing or eliminating raised grain on successive coats of clear finish. Gelled stains, such as those sold by Wood-Kote, do an even better job of sealing the wood. However, these products do not clean up with water. And, if you choose an oil-based stain, make certain the stain has dried completely before applying a water-based finish.

Continued

Sand the surface smooth with 150- and 220-grit sandpapers.



An old nylon stocking helps you strain coagulated chunks and other debris from the finish. You can also purchase cone-shaped strainers just for this purpose.

6 Strain the finish. In our tests, chunks of coagulated coating occasionally accumulated inside the containers of the water-based finishes. These chunks were the No. 1 culprit in surface blemishes. To eliminate this problem, pour the finish into a clean second container through a cone-type strainer or nylon stocking as shown on page 45.

7 If possible, use a sanding sealer. Amity, Hydrocote, and Minuteman sell water-based sanding sealers, and we highly recommend these for your first coat or two. These sealers build more quickly than the finishes, and also sand much more easily.

8 Brush on the finish. To keep bubbles to a minimum, use a high-quality, clean, nylon/polyester brush. Dip it no more than 1" or so into the strained liquid to prevent overloading the brush. After completing your work, you can pour any remaining strained finish back into the container supplied by the manufacturer.

Since heavy coats raise the grain of bare wood more than thin coats, apply a thin first coat. This coat will seal the grain and allow you to apply heavier successive coats. Minimize your brush strokes over already-wetted areas.

On contoured surfaces, smooth the finish with 3M Scotchbrite pads instead of steel wool.

9 Allow the coats to dry thoroughly. Although the finish may feel dry after only 15 minutes, allow each coat to dry at least one hour before applying the next. Otherwise, you may seal moisture beneath your top coats, leaving the finish with a milky appearance. You can reduce drying times with a fan or hair dryer set on low heat to speed evaporation. Be careful. Overheating may cause blisters.

10 Sand between successive coats. After sanding your first coat with 220-grit sandpaper, brush on following coats as described in Step 7. Because of the high solid content of water-based finishes, even thin coats build fast and provide a tough protective layer.

For irregular surfaces, such as the table leg shown at *left*, smooth between coats with a fine 3M Scotchbrite pad. Steel wool does not work because any bits of the steel left on the wood surface will rust. Steel screws will rust, too.

POINTS TO KEEP IN MIND FOR SPRAYING

If you can afford it, a spray system produces the best possible results with water-based finishes. In our trials, the coatings worked equally well with conventional spray guns and the new high volume, low pressure (HVLP) systems designed to minimize overspray.

With a conventional system, we had our best results at 20 PSI and a 6–8" spray pattern. Keep in mind that you must thoroughly clean water-based finishes from all parts of your gun to prevent rusting and finish buildup. We noticed that the coatings formed a skin over the nozzle if the gun was left to sit for just a few minutes. So, do as much spraying as possible in one session, then immediately clean the gun thoroughly with water.

Conventional spray systems waste more than half of your finish by dispersing it into the air (mostly in the form of overspray), so manufacturers have developed HVLP machines that place 70–80 percent of the finish on the workpiece. The result: less pollution and nearly twice the finish-transfer efficiency. We tried the two HVLP systems shown at *right* and liked what we saw. If you already own a compressor, you can make the switch to HVLP for about $350 by replacing your conventional gun with a unit such as the HVLP 5000 from HVLP Technologies (see the phone number on the opposite page). This unit consumes 6–13 cfm, requiring at least a 2 hp compressor with a 20-gallon tank for most woodworking tasks. Or, you can purchase a stand-alone turbine sprayer such as the Amity model 1000 for about $725. (More expensive models are also available for extensive-use applications.) The turbine feeds a stream of warm air to the gun at 5 psi. In our tests, the HVLP 5000 produced a better finish than the Amity 1000, but the Amity unit created less overspray.

The Amity 1000 turbine unit (*foreground*), and HVLP 5000 (*in hand*).

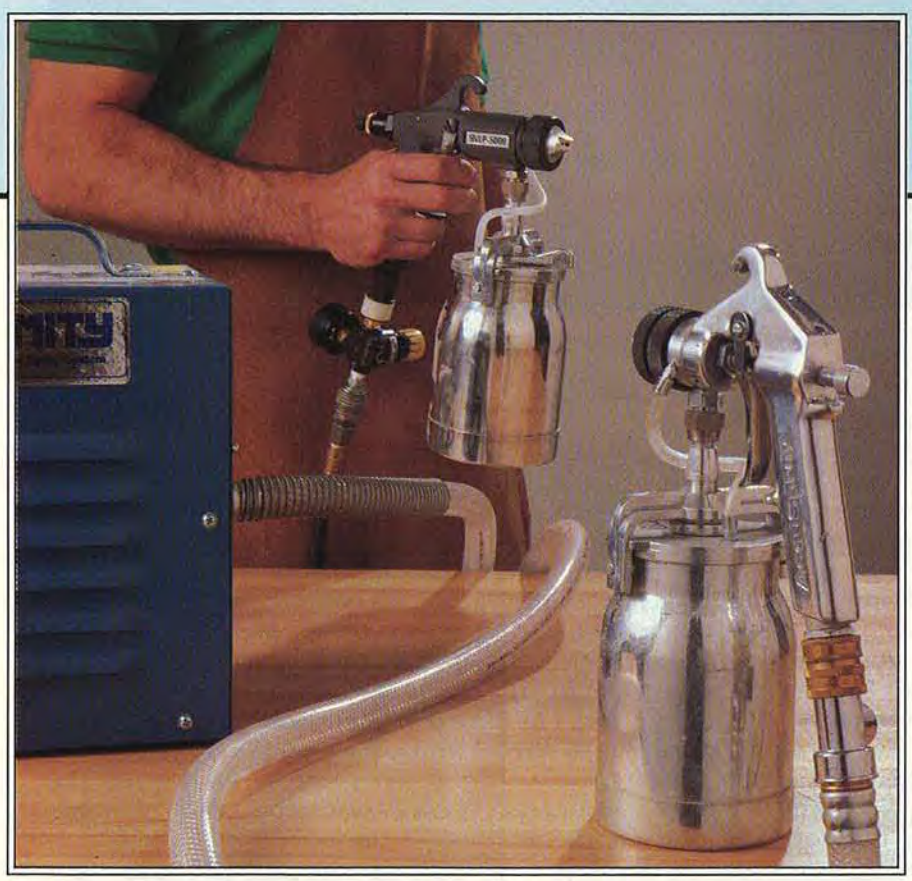
HOW TO COVER A LARGE SURFACE

After rolling on the finish, smooth it by lightly dragging a brush across the surface.

To quickly and effectively finish tabletops, doors, or other large surfaces, professionals often employ this trick. First, roll a thin, uniform layer of finish onto the surface with a ¼"-nap roller. Then, lightly drag a high-quality brush across the wet finish as shown at *left* to even out the coating and eliminate bubbles.

On surfaces of more than two square feet or so, we also had good luck with short-hair painting pads. These handy applicators quickly put a thin, even layer of finish over a 6–8"-wide surface. Try to simply lay the finish down and not re-pad it.

Water-based products dry quickly, so you won't have time to rebrush the finish. Keeping that in mind, carefully plan how you'll finish the project before getting started.



MANUFACTURERS' LISTING

Amity: 800-334-4259 or 608/837-8484

Basic Coatings (Professional Image finishes): 800-247-5471 or 515/288-0231

Behlen: 518/843-1380

Deft: 800-544-3338 or 714/474-0400

Flecto (Varathane finishes): 800-635-3286 or 415/655-2470

HVLP Technologies: 805/525-5940

Hydrocote: 800-229-4937 or 201/257-4344

Minuteman Furniture Restoration Systems: 800-733-1776

Parks (Carver/Tripp finishes): 800-225-8543 or 508/679-5938

Star Bronze (Zip-Guard finishes): 800-321-9870 (product questions) 800-533-9332 (locations of dealers) or 216/823-1550

Wood-Kote: 800-843-7666 or 503/285-8371

Written by Bill Krier with Wade Sundeen, Jim Downing, and Jim Boelling. Photographs: Hopkins Associates

SPICED-UP SPICE

Print this article

Bill Krier, WOOD magazine's products/techniques editor, and his wife Carrie enjoy hunting for bargain antiques. But when they were unable to find a spice cabinet in good condition for less than $200, Bill took the initiative and designed his own—the one you see here.

Note: *Whole spices such as peppercorn, cloves, allspice, and nutmeg can be stored directly in the drawers. For storing ground spices, keep them tightly sealed in their purchased container or in a plastic bag. Spices lose their freshness, aroma, and flavor over time.*

First, build the case

Note: *You'll need some thin stock for this project. Plane or resaw thicker stock to size.*

1 Cut a ⅜"-thick piece of oak to 8½×12⅛" for the case sides (A). Cut the divider (B), and the top and bottom (C) to the sizes listed in the Bill of Materials.

2 Mark the locations, and cut ¼" dadoes ⅛" deep in the case-sides where shown in the drawing on the *opposite page, bottom,* and where dimensioned on the Exploded View drawing. Cut the same size dadoes in the divider.

3 Rip two 4"-wide pieces from the 8½"-wide dadoed board to form the 4"-wide side pieces (A).

4 Cut the facing strips (D) to size plus 1" in length.

5 Now, cut ⅜" dadoes 3⁄16" deep in the top and bottom pieces where shown on the drawing.

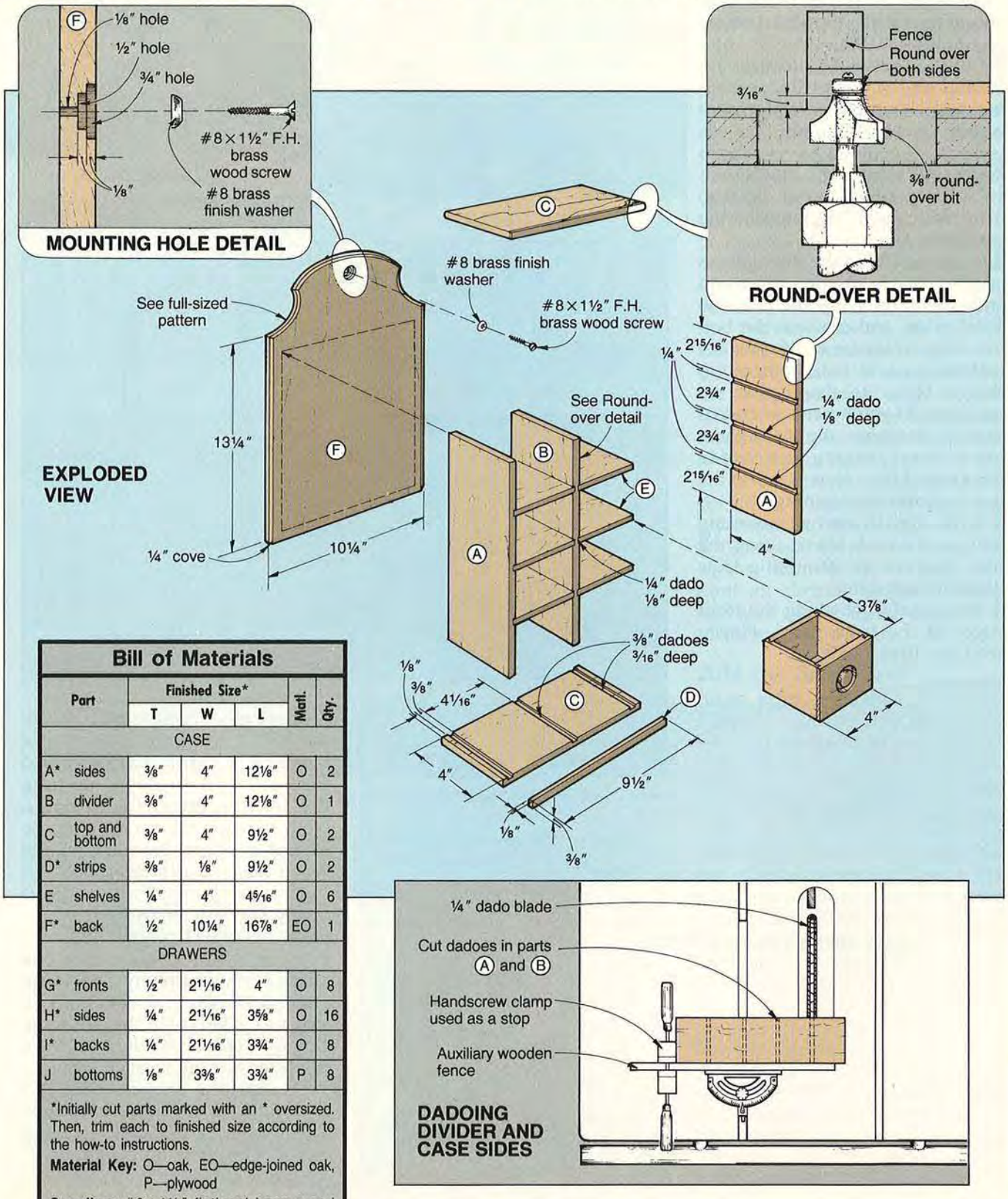
6 With the top and bottom surfaces flush and about ½" of overhang on each end, glue a facing strip (D) onto the front of the dadoed top and bottom pieces. After the glue dries, scrape off the excess and trim the ends of each strip flush with the ends of the top and bottom pieces. *Be careful not to shorten the ends of the top and bottom pieces when trimming the ends of the facing strips.*

7 Fit your table-mounted router with a ⅜" round-over bit. Position the fence where shown on the Round-over detail. The fence prevents the bit pilot bearing from dipping into the previously cut

Continued

CABINET

Our rendition of an Early-American kitchen favorite



Bill of Materials

Part		Finished Size* T	W	L	Matl.	Qty.
CASE						
A*	sides	⅜"	4"	12⅛"	O	2
B	divider	⅜"	4"	12⅛"	O	1
C	top and bottom	⅜"	4"	9½"	O	2
D*	strips	⅜"	⅛"	9½"	O	2
E	shelves	¼"	4"	4 5/16"	O	6
F*	back	½"	10¼"	16⅞"	EO	1
DRAWERS						
G*	fronts	½"	2 11/16"	4"	O	8
H*	sides	¼"	2 11/16"	3⅝"	O	16
I*	backs	¼"	2 11/16"	3¾"	O	8
J	bottoms	⅛"	3⅜"	3¾"	P	8

*Initially cut parts marked with an * oversized. Then, trim each to finished size according to the how-to instructions.

Material Key: O—oak, EO—edge-joined oak, P—plywood

Supplies: #8×1½" flathead brass wood screw, #8 brass finish washer, finish.

¼" dado blade
Cut dadoes in parts A and B
Handscrew clamp used as a stop
Auxiliary wooden fence
DADOING DIVIDER AND CASE SIDES

SPICE CABINET

dadoes. Rout the front edge of parts A and B, and the front edge and sides of the top and bottom assemblies (C, D).

8 Cut the shelves (E) to size.

9 Sand all the parts. Glue, assemble, and clamp the case pieces together. Check for square.

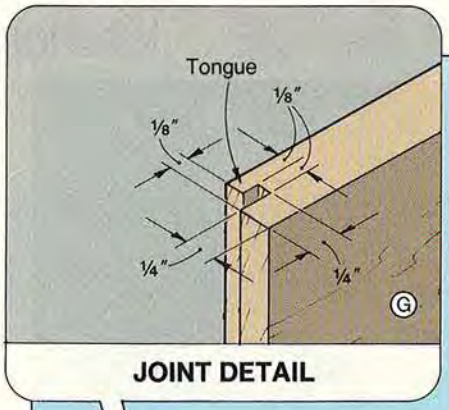
Now, let's add the back

1 Cut three pieces of ½" stock to 3 7/16" wide by 17¼" long for the case back (F).

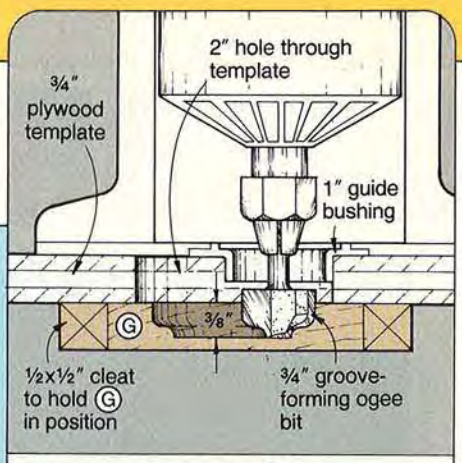
2 Glue and clamp the three pieces edge to edge, with the surface and ends flush. Later, rip the panel to 10¼" wide, and crosscut the bottom edge to square it. Transfer the half-pattern and hole centerpoint shown *below* to the top of the back panel (you'll need to do this twice). Bandsaw the back-panel top to shape, cutting just outside the marked line. Now, sand to the line to finish the shaping.

3 Drill the decorative mounting hole in the back blank, using the hole sizes on the Mounting Hole detail for reference.

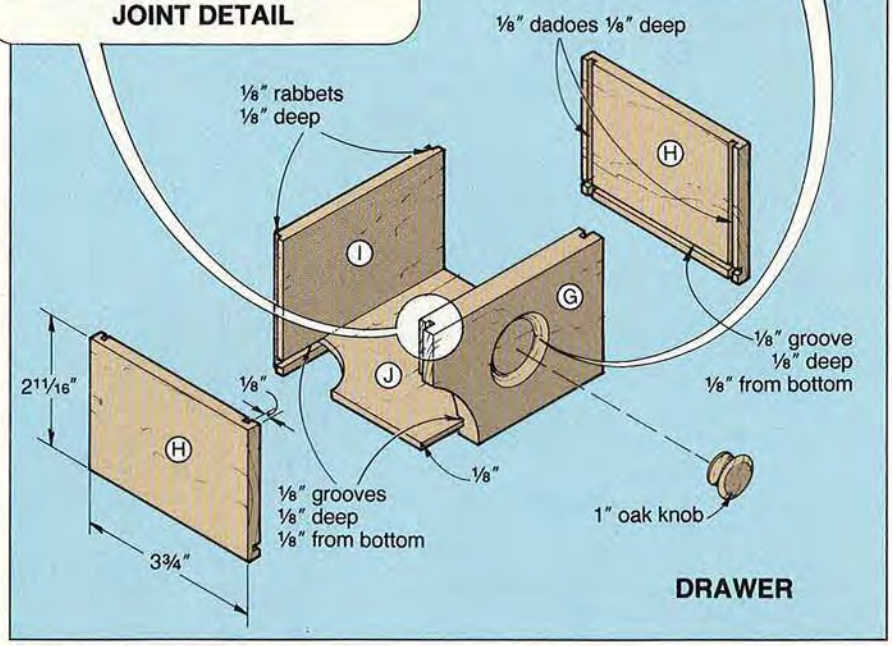
4 Rout a ¼" cove along the front edges of the back panel. Finish-sand the back piece.



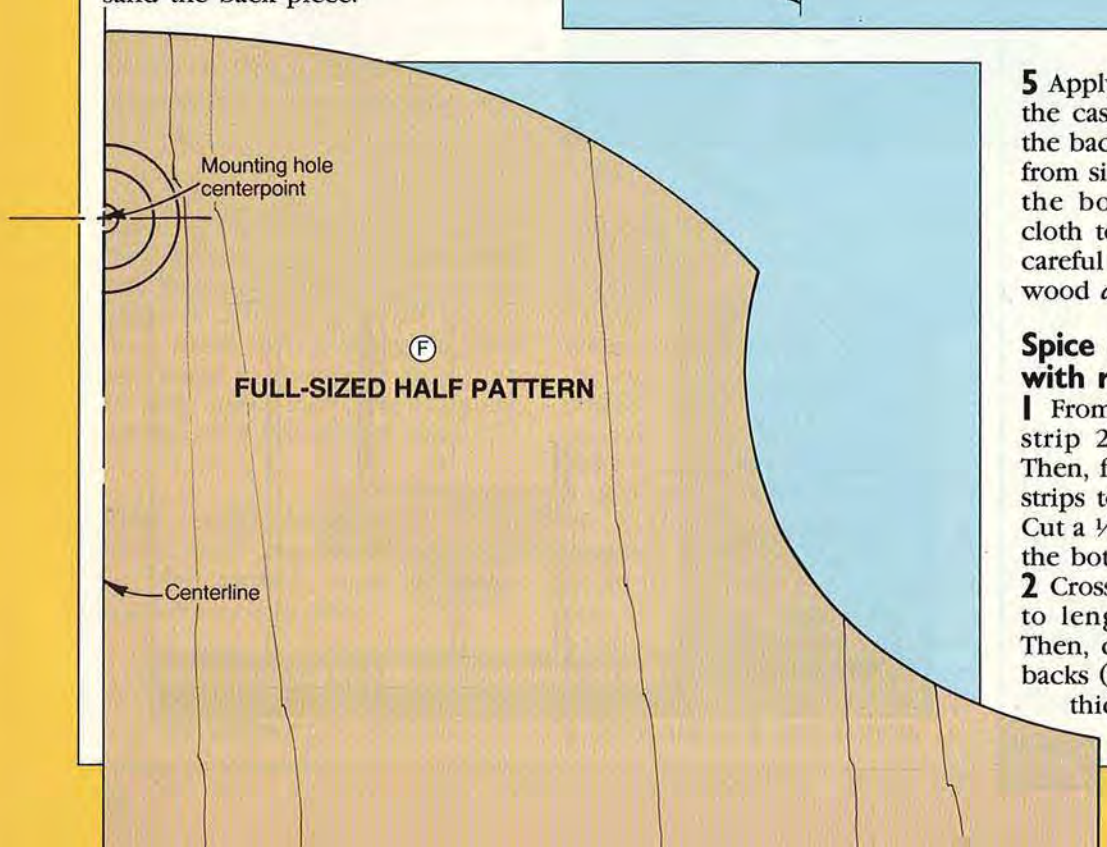
JOINT DETAIL



RECESS DETAIL



DRAWER

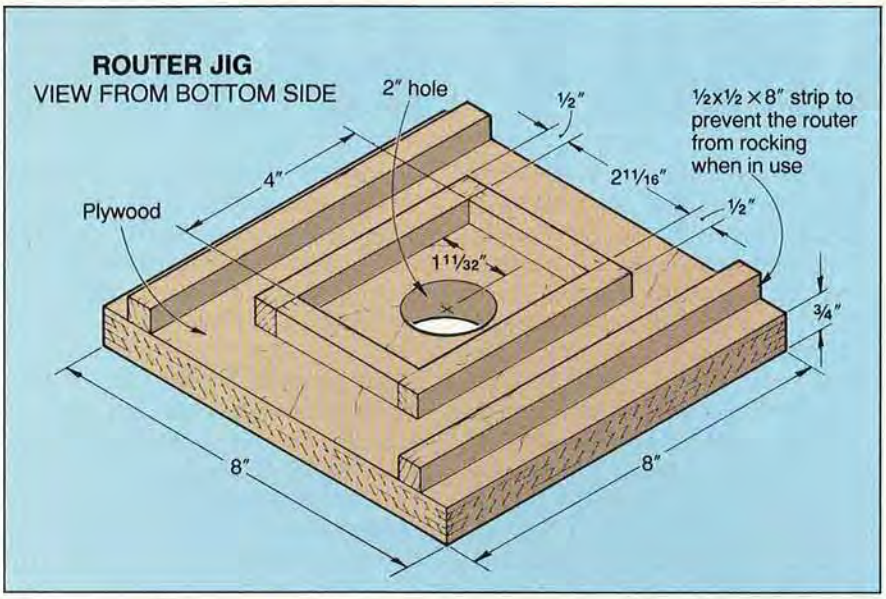


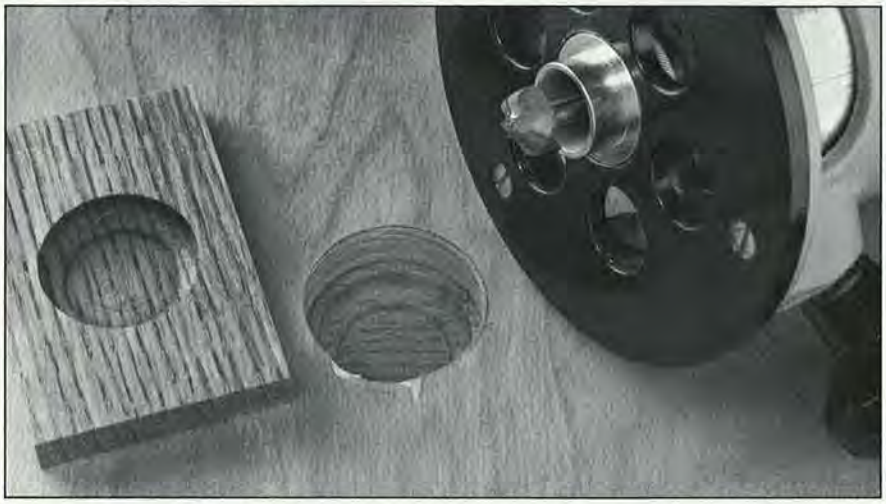
5 Apply glue to the back edges of the case. Clamp the front face of the back (F) to the case, centered from side to side and ⅜" up from the bottom edge. Use a damp cloth to wipe off excess glue. Be careful to wipe the glue off the wood *and not into the wood.*

Spice up the drawers with recessed pulls

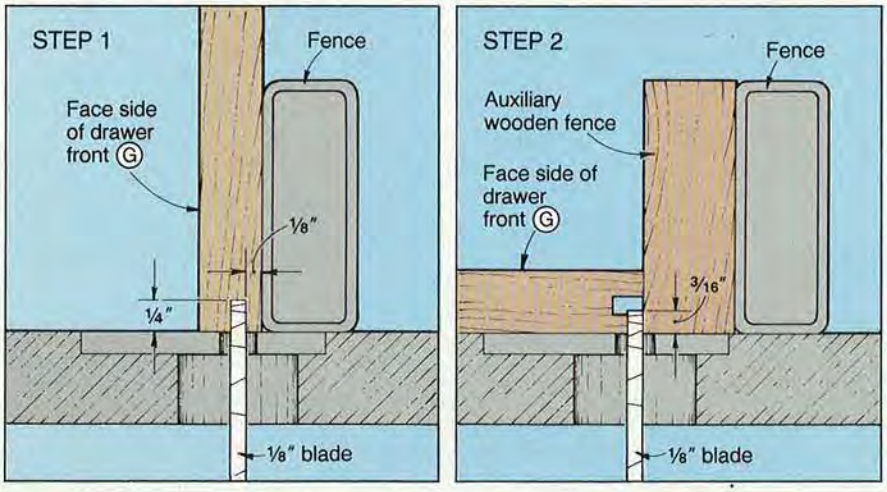
1 From ½"-thick stock, cut one strip 2 11/16" wide by 36" long. Then, from ¼"-thick oak, cut two strips to 2 11/16" wide by 48" long. Cut a ⅛" groove ⅛" deep ⅛" from the bottom edge in each strip.

2 Crosscut the drawer fronts (G) to length from ½"-thick stock. Then, crosscut the sides (H) and backs (I) to length, using the ¼"-thick strips.





Position a drawer front into the routing jig and rout the depression. A routed front and the router are shown at left.



3 Build the routing jig shown at *left*, and put one of the drawer fronts into the jig. Fit your router with a ¾" groove-forming ogee bit and a 1" guide bushing.

4 Rout a recess into the drawer front as shown in the photo, *middle left,* and shown in the Recess detail accompanying the Drawer drawing. Remove the piece from the jig, and repeat with the remaining drawer fronts.

5 Follow the two-step drawing, *bottom left,* to form the joint on both ends of each drawer front. See the Joint detail accompanying the Drawer drawing for dimensions of the finished joint.

6 Cut a ⅛" dado ⅛" deep ⅛" from the front and back edge of each drawer side (H). Then, cut a ⅛" rabbet ⅛" deep along both ends of the drawer back (I).

7 Cut the drawer bottoms (J) to size from ⅛" stock. (We used oak plywood; hardboard also works.)

8 Glue each drawer, checking for square. Remove the clamps and sand all surfaces smooth. Center and glue a knob in the depression in each drawer front.

Add the finish, and hang your cabinet

1 Finish-sand the case and drawers. Add the finish of your choice. (To seal our cabinet and drawers, we started by brushing on a thin coat of satin water-based lacquer. Later, we sanded the assemblies thoroughly with 320-grit sandpaper. Then, we applied two more coats, continuing to sand between coats with 320-grit paper.)

2 Mount the cabinet to the wall with a ½" countersunk brass washer and a #8×1½" flathead brass wood screw.

Buying Guide

• **Oak knobs.** One dozen (minimum order) 1"-diameter oak knobs, catalog no. 803-783, $6.10 ppd. Woodworker's Supply, 5604 Alameda Place NE, Albuquerque, NM 87113.

Produced by Marlen Kemmet Project Design: Bill Krier Photographs: Hopkins Associates; Bob Calmer Illustrations: Kim Downing; Bill Zaun

REPLANTING THE FAMILY FARM

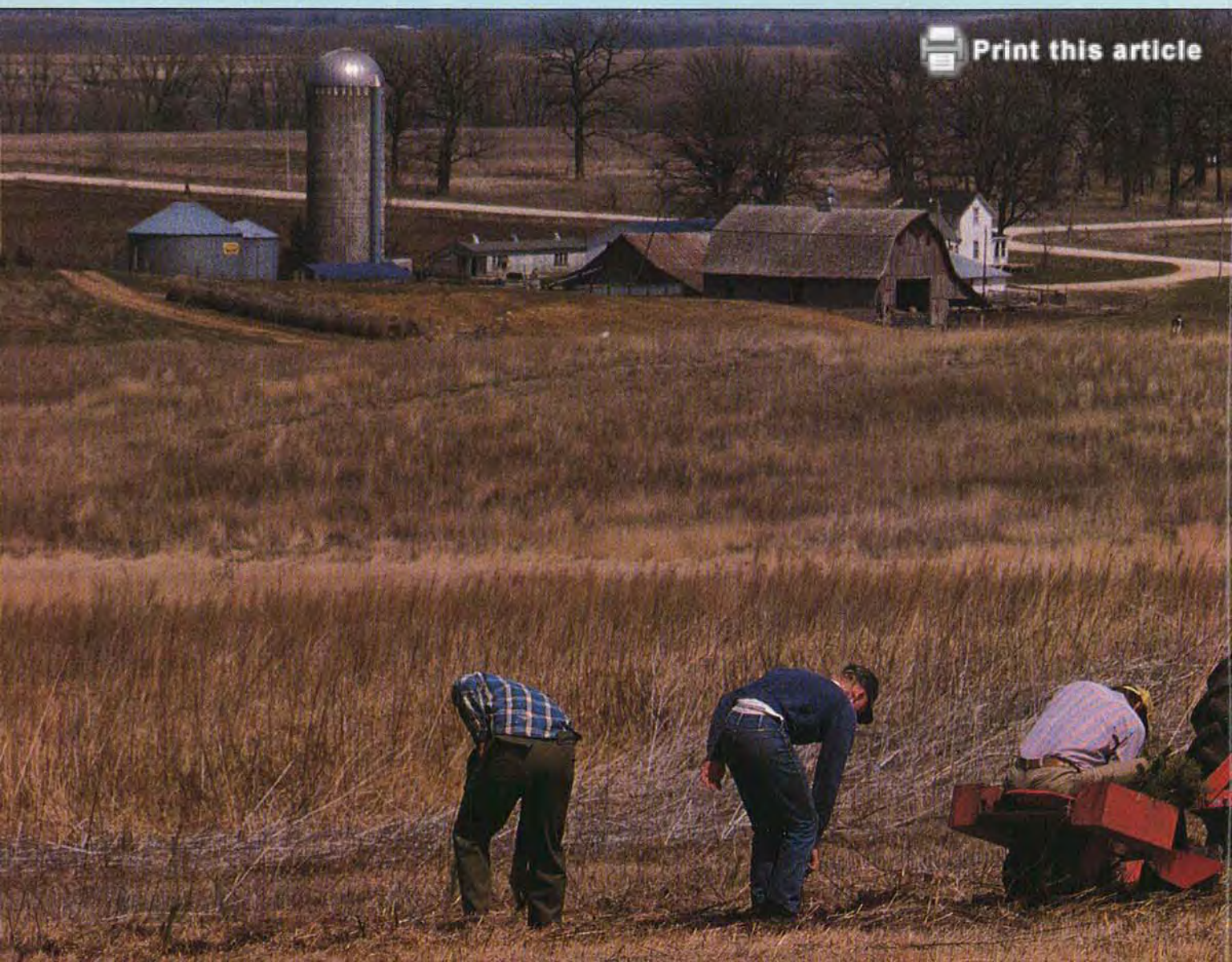
Three times a year, one Iowa native returns home from Colorado on a pilgrimmage. He's replanting the family farm his way—in black walnut, red oak, white ash, and other species. For his forestry efforts, he'll rescue the soil from erosion, resurrect wildlife habitat, and down the road, reap a respectable return on investment.

Kevin Kyhl loves the land now just as much as when he was growing up on it. The family farm, near Parkersburg in north-central Iowa, was a place to work, sure enough. But it was a place to enjoy the outdoors, too, with a hike through the woodlot or a hunt in the fields. And, as time passed, the land became a thing to improve and preserve.

Now, that affection brings Kevin back year after year from Colorado. At the farm, he prepares the ground, then plants the seedlings and tends young saplings. We caught up with him last spring, when he was back at it, planting up a storm.

Stomping in trees

On this cool, dry, spring morning, Albert Jans, 72, a retired farmer from Parkersburg, drives the tractor while Kevin rides the tree planter. Two local high school seniors, Mitch Cashatt and Jon



"In the Fifties, there were oaks and hickories covering those hills. It's about time we began to put something back in the ground."

—Albert Jans, retired Parkersburg, Iowa, farmer

Klinkenborg, walk behind, stomping down the earth around each of the 3,500 trees that will go into the ground—an incredible 500–700 per hour! The trees—12″-tall, year-old black walnut and red oak seedlings—are bare root stock, bought from the state nursery by the thousands at 18 cents a piece—considerably less than a single board foot of either species at the going rate.

Kevin, 37, and his brothers before him, have planted about 77,000 such trees on the 280-acre farm during the last 10 years. Eventually, the land will boast 50 acres of young trees, a complement to the original 40-acre woodland of mature oak, hickory, and walnut. For 27 acres of the new forest—those enrolled in the federal Conservation Reserve Program (CRP)—Kevin will be reimbursed up to half the cost of planting, then be paid about $100 annually per acre for 10 years (see box, *next page).*

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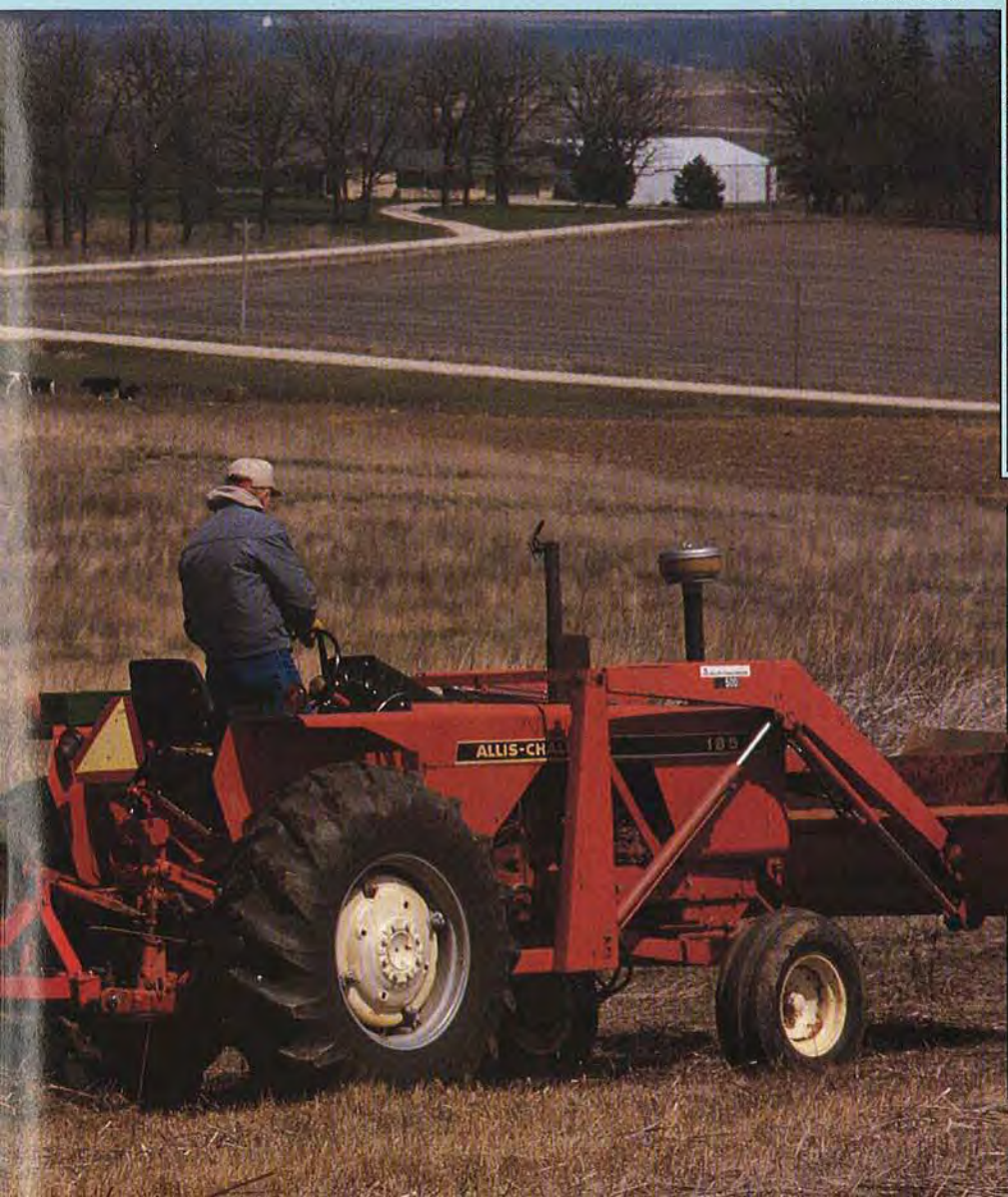
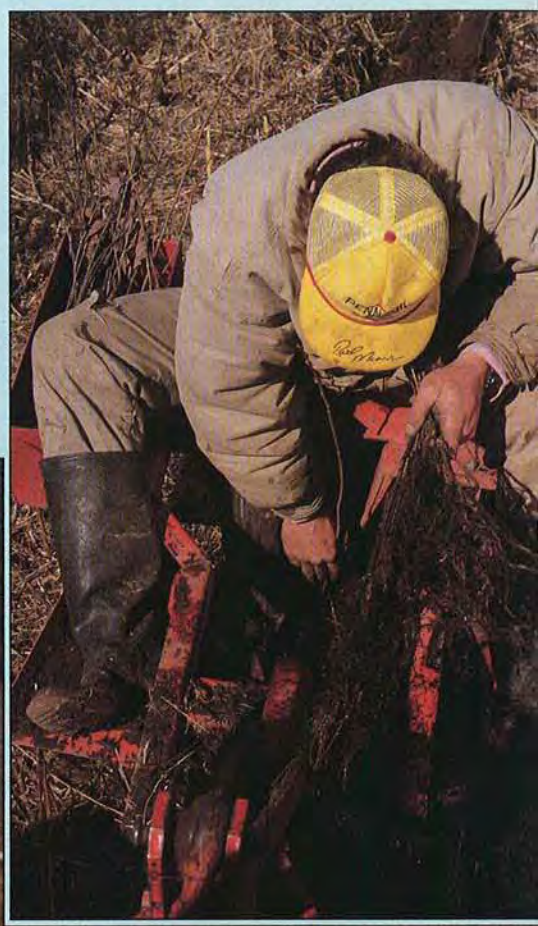


Bottom: **Near Parkersburg, Iowa, Kevin Kyhl and his trio of workers replant rolling farmland with trees. On a spring day such as this, they'll set 3,500 walnuts and red oaks into the rich soil.**

Below: **From his seat on the tree planter, Kevin plugs year-old seedlings into the furrowed ground. Now 12″ tall, the walnuts and oaks will reach saw-log size in 45 years, veneer size in 60 years.**



Did you know . . .

•That nearly 60 percent of all timber harvested each year in the United States comes from private, nonindustrial woodlands? Often as small as a few acres, these forests yield wood for paper, lumber, and veneer.

•That trees prevent soil erosion? Cropland with fragile soil can lose up to 30 tons per acre annually. Compare this to the few teaspoonfuls of soil lost when you plant the land to a stand of trees.

THE FAMILY FARM

The walnut entrepreneur bought the land from his two older brothers about five years ago. Now Kevin, who owns and operates a textile-design firm in Fort Collins, Colorado, is in charge. "In the spring, I spend two weeks here planting trees," he says. "Then, I bring my wife, daughters, and son back in the summer for at least a week's vacation, and I follow up in November to combine some pheasant hunting with needed tree maintenance."

A district forester from the Iowa Department of Natural Resources advised Kevin in the turnover of the cropland to trees. "I learned what trees to plant, how to plant, and where to plant them," he comments. "And then, like most people I guess, I picked up a lot of information by trial and error."

Kevin's learn-by-doing approach has resulted in a couple of minor misfortunes: planting a pine species that the local deer herd just loved to nibble, and a costly experiment with hybrid walnut trees that didn't perform. But after the last few years, he knows the tree-growing ropes now, and the amount of work entailed.

Competition down on the farm

It's never an easy life on the farm, even for trees. To become valuable timber, black walnut seedlings require the same protection from takeover weeds as corn and soybeans. Instead of velvet leaf and wild sunflower as enemies, though, trees can succumb to tall and thick bromegrass that spreads quickly to strangle seedlings.

High-school seniors Mitch Cashatt, foreground, and Jon Klinkenborg bend over to straighten each seedling, then tamp down the rich, dark soil around its roots with their heels.

"Before planting in the spring, I have to spray the planting area with Roundup [a defoliating herbicide] to kill ground cover," Kevin says. "Then, until the trees get their heads in the sky [about five years], I keep the brome down by regularly applying Princep [a selective herbicide]."

Tree planting, and managing, requires another important consideration besides start-up competition from wild grasses and weeds. To provide quality lumber and veneer, a mature walnut's trunk must run straight and branch-free for at least 16'. And sunshine can be both enemy and friend.

In a forest setting, black walnut has little competition from ground cover, and the shade provided by surrounding trees limits the development of lower branches. In seeking the necessary sunlight, the young black walnut tree ascends straight, making the perfect veneer log.

In an open farm field, however, sunshine engulfs the baby black walnut. If the tree outgrows the surrounding grasses, it soon shoots out side branches, waylaying nutrients much needed for the preferred vertical growth. Even with pruning, an open-grown walnut may only mature into firewood.

WHAT IT COSTS TO PLANT WALNUT—AND WHO HELPS OUT

Planting trees does require an investment of time and money. Here's the typical cost in Iowa:

- *Seedlings.* A normal planting of 700 per acre costs about $140 per acre, if stock sells at 20 cents each. State nurseries charge less; private nurseries more.
- *Planting.* Contractors charge $70 to $100 per acre. With a tree planter (often loaned free by state agencies), three people can plant an acre an hour. It also can be done by hand.
- *Weed control.* Applying herbicide once a year averages $30 to $40 per acre for five years.
- *Mowing.* Between-row mowing averages $20 to $30 per acre, necessary two or three times annually for about five years.

And, here's some of the financial and planning help available:

- *Conservation Reserve Program (CRP).* Authorized under the 1985 Farm Bill as a means to control erosion, CRP pays landowners about $100 per year per acre for 10 years to take acreage out of production. For tree planting on land that qualifies, CRP reimburses a minimum of 50 percent of the costs incurred. Requires five-year program of weed control on minimum of 10 acres. The national goal is to plant 12 percent of CRP acres to trees.
- *Agricultural Conservation Program (ACP)* and the *Forestry Incentives Program (FIP).* Both are one-year incentives to plant trees on a minimum of three acres. Each pays 50 to 70 percent of planting costs, not to exceed $125 per acre.
- *Resource Enhancement and Protection (REAP).** Funds come from state lottery. Pays up to 75 percent of tree-planting costs for a year, or can be coupled with other programs to provide that

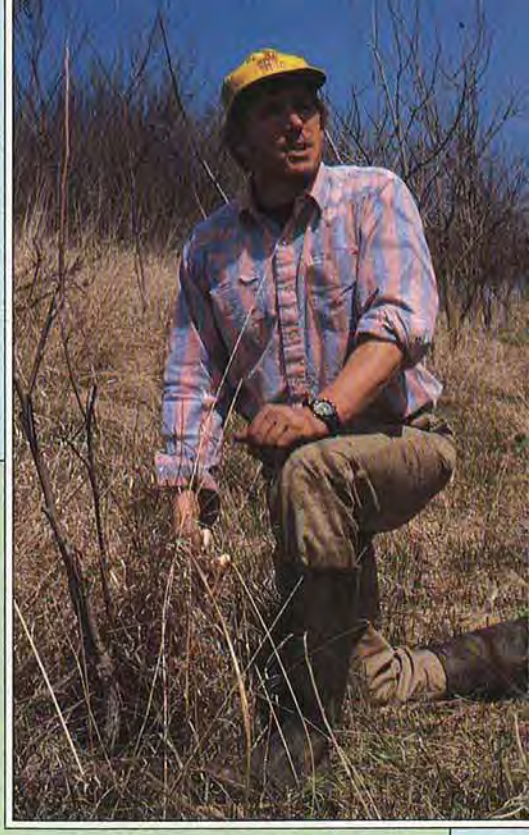
"That's why I mix in red oak with the black walnut about 6′ apart in the row," Kevin explains. "The oaks have larger, bushier leaves than the walnuts, and more rapidly provide shade to not only hold the grass down, but keep the walnuts from branching out. In forestry, they're called trainers." With rows spaced 10′ apart, the trees also receive side protection.

Shaping up prime walnut

Yet, with all this planning, Kevin expects to do annual limb pruning on his walnuts, because if done early and properly, it results in as much as a tenfold value increase at harvest.

According to Kevin, the object in pruning is to maximize the development of the first 16′ of trunk to veneer quality. This means removing limbs from the bottom up before they develop heartwood (at about 1″ diameter). Taken off early enough, branches will only leave knots in the core of the tree, yielding valuable clear veneer at harvest.

Kevin, of course, won't have to even think about pruning his newly planted trees for at least five years. He can, though, practice pruning techniques on the walnut trees planted by his brothers a decade ago—they're now 6–8″ in diameter. He also has about 8 acres of Christmas trees to shear during the 10 years it takes for them to reach maturity. "They're my somewhat immediate cash crop," chuckles Kevin. "They'll help defray other planting costs."



Kevin kneels by a walnut tree planted five years ago. On the edge of the other plantings, it was stunted by brome grass.

amount of reimbursement. Land in program must be maintained in trees for 20 years.

- *Forest Reserve.** This law exempts qualifying woodlands of two acres or more from property tax. Land-use and harvest restrictions apply.
- *Planning help.* Contact a state forester, county conservation board member, local Soil Conservation Service office, or private consulting forester for advice on how you can get started.

**Indicates Iowa state plan, may vary or not exist elsewhere.*

INVESTING IN TREES

Illinois residents Ron Sippel and Jack Schultz wanted a long-term investment for their heirs that gained in value but wasn't a tax burden. They decided on walnut trees.

The investors purchased 132 acres in Floyd County, Iowa, then asked state forester Gary Beyer to develop a planting and management plan. Here's a look at it:

Costs

Land = 132 acres @ $700 ..... **$92,400**
Planting = Site preparation, trees, planting **$33,000**
Weed control = Spraying @ $35 per acre over five years **$23,100**
Total outlay **$148,500**

Repayments

Federal cost-sharing = ACP and FIP program tree-planting reimbursements @ $125 per acre **$16,500**
CRP enrollment = Payments for non-production of crops, @ $100 per acre for 10 years **$132,000**
Cash payback **$148,500**

Tax incentive

Non-taxable benefits = After the CRP contract expires (10 years), land qualifies for tax-exempt status under Iowa Forest Reserve law for 55 years to tree maturity ..... $?
Long-term taxing = At harvest, income from trees taxable at then-current capital-gains rate ..... $?

Return from timber sale

(The following are conservative projections based on typical walnut growth, today's timber prices, and do not include returns from trainer-trees such as oak and ash thinned before the walnut harvest.)

Thinning for saw logs at 45 years = 19 walnut trees per acre of at least 16″ diameter and containing 100 board feet (bft) per tree, sold at $1 bft ..... **$250,800.**
Final harvest of veneer logs at 60 years = 26 trees per acre of 20″ dia., each containing 180 bft, sold at $3 bft ..... **$1.85 million.**

Says forester Gary Beyer, "It's not so much the end value to look at, but the average 15 to 20 percent per year added return from the time the walnuts reach 14″ diameter to when they get to 20″. The investors' children jump into the earning curve at a 20 percent return."

Written by Peter J. Stephano. Photographs: Richard Sanders

Get a jump on Summer

CASUAL

MAHOGANY OUTDOOR FURNITURE

Tired of buying bargain-brand outdoor furniture and having it fall apart in a year or two? Are you ready for a table and chair set that will look as good in five years as it does today? Then, have we got a deal for you! Solidly built out of genuine (Honduras) mahogany (see page 32 for machining tips), and stylishly designed, this dynamic project duo spells value.

Here we explain how to make the chairs; in the next issue, we'll cover the table construction.

Start with the legs

Note: *You'll need some 2½ × 2½" mahogany for the front and rear legs. We were able to purchase stock this size. If you have trouble locating stock this thick, laminate thinner stock to size. Also, if you plan to use the table and chairs outdoors, use either slow-set epoxy or resorcinol glue.*

1 Rip and crosscut the two rear legs (A) and the two front legs (B) to the sizes listed in the Bill of Materials. Chamfer both ends of the rear legs and the bottom end of the front legs. (We chamfered ours on the tablesaw, with the blade at 45° and the miter gauge fitted with an auxiliary wooden fence to support the long stock.)

2 To form the curved sections (C) that attach to each front leg, cut a piece of 2½" square mahogany to 1 9/16 × 2½ × 12¾". Then, lay out the two curved sections (in-

Print this article

CLASSICS

THAT WILL LAST AND LAST

cluding the tenons) on the stock using the Front Leg grid on the next page as a guide.

3 Attach an auxiliary wooden fence to your tablesaw rip fence. Refer to the six-step drawing on the next page to form the top of each front leg.

Now, form the mortises in the legs

1 Mark the mortise centerpoints on the two rear legs (A) and the two front legs (B) where shown on the Rear and Front Leg drawings. Remember that you are working in pairs of As and Bs. When the legs are in the position shown on the Exploded-View drawing, the corresponding mortises must face each other.

2 Form the mortises, following the four steps in the Mortise Forming detail accompanying the Front and Rear Leg drawings.

Cut the tenons and the other frame members

1 Cut the top seat rails (D) and bottom rails (E) to the sizes listed in the Bill of Materials. Cut the stretcher (F) to size plus 1" in length. Cut the support rails (G, H), seat slats (I, J), armrests (K), backrest bottom rail (L), and backrest top rail (M) to size. (Do not make the contour cuts on parts D and K yet; you'll cut them to shape after tenoning.)

2 Cut tenons on both ends of the seat rails (D), bottom rails (E), and support rails (G, H), using the dimensions on the drawing titled Forming the Tenons. Refer to the Side Rail grid for sizes, and cut the tenons on the side rails (D). Then, referring to the Arm-

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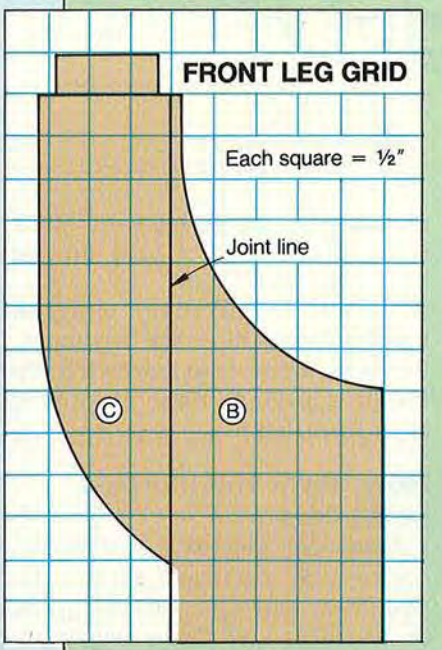
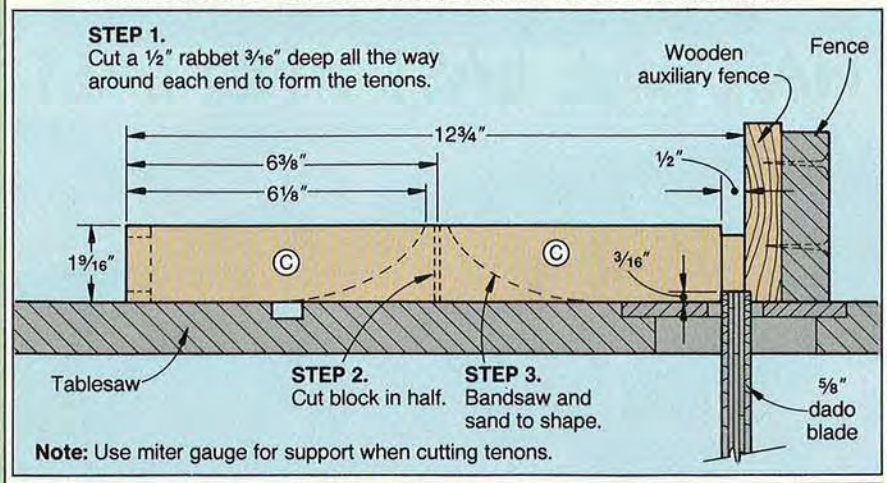
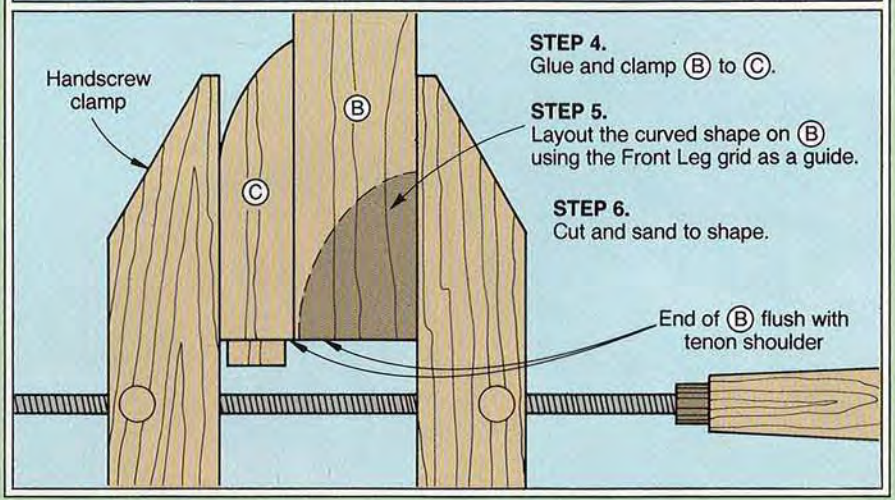
CASUAL CLASSICS

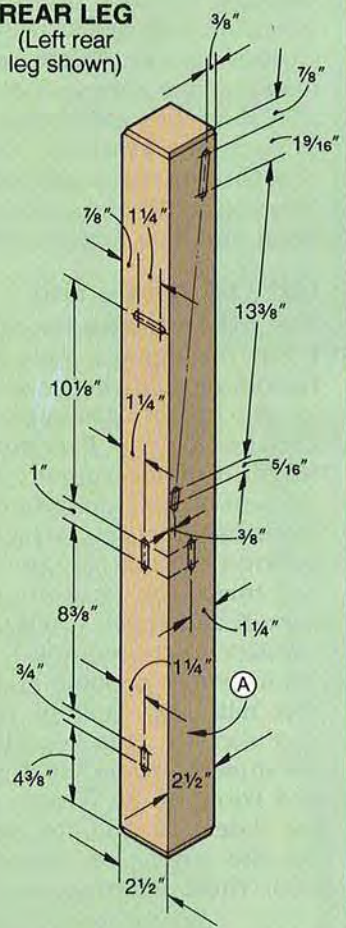


FORMING THE CURVED SECTION OF EACH FRONT LEG

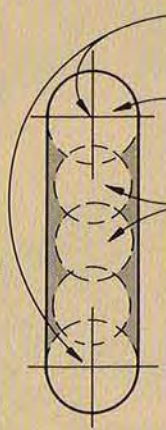



Handscrew clamp
B
C
STEP 4.
Glue and clamp B to C.
STEP 5.
Layout the curved shape on B using the Front Leg grid as a guide.
STEP 6.
Cut and sand to shape.
End of B flush with tenon shoulder

REAR LEG
(Left rear leg shown)



MORTISE FORMING DETAIL

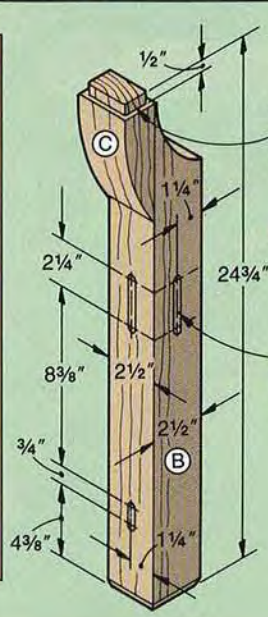


STEP 1.
Mark centerpoints where dimensioned.

STEP 2.
Drill a ⅜" hole 1 1/16" deep at each centerpoint.

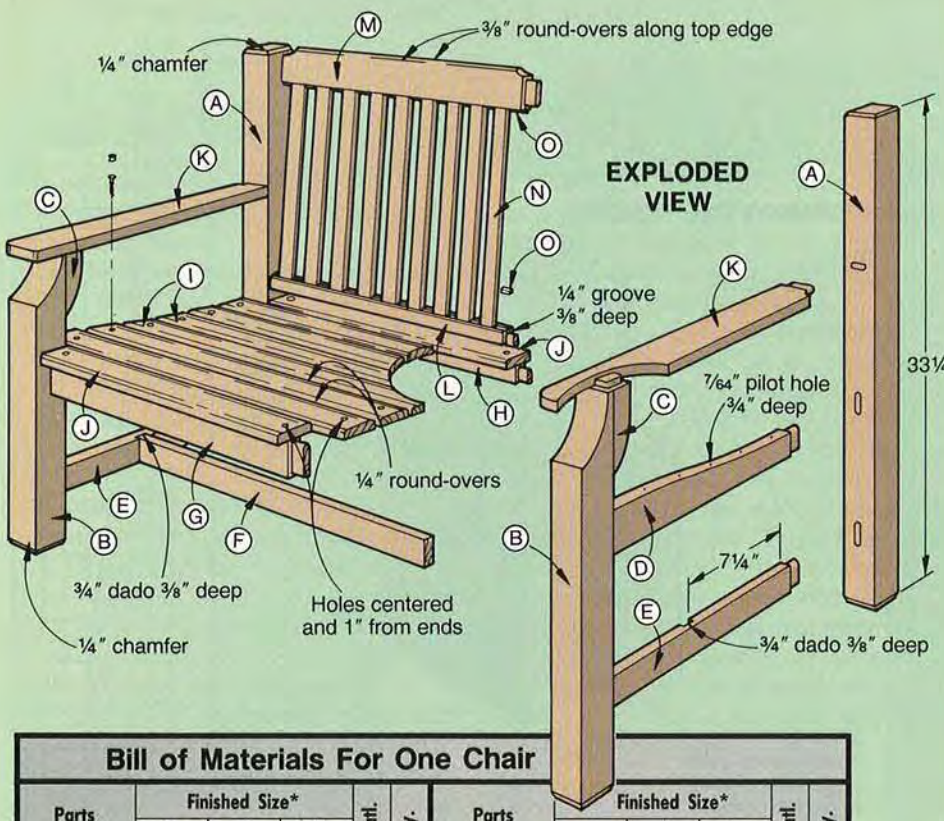
STEP 3.
Drill overlapping 5/16" holes 1 1/16" deep to remove excess material.

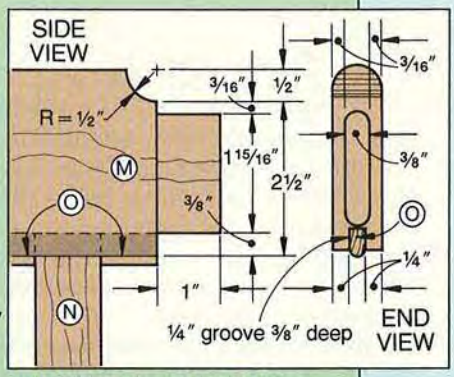
STEP 4.
Chisel mortise sides.



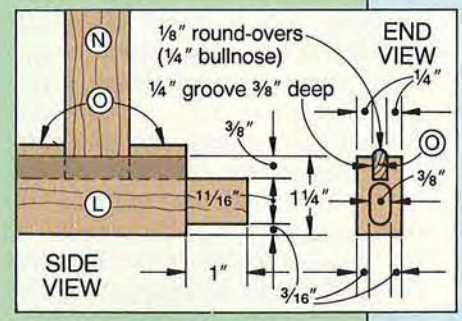
FRONT LEG
(Right front leg shown)

All mortises are ⅜" wide by 1 1/16" deep

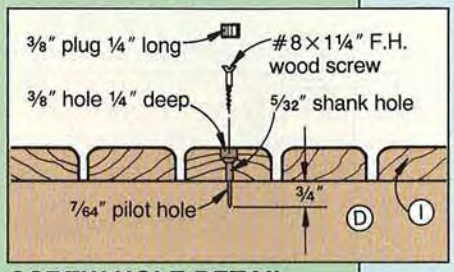




BACKREST TOP RAIL DETAIL



BACKREST BOTTOM RAIL DETAIL



SCREW HOLE DETAIL

Bill of Materials For One Chair

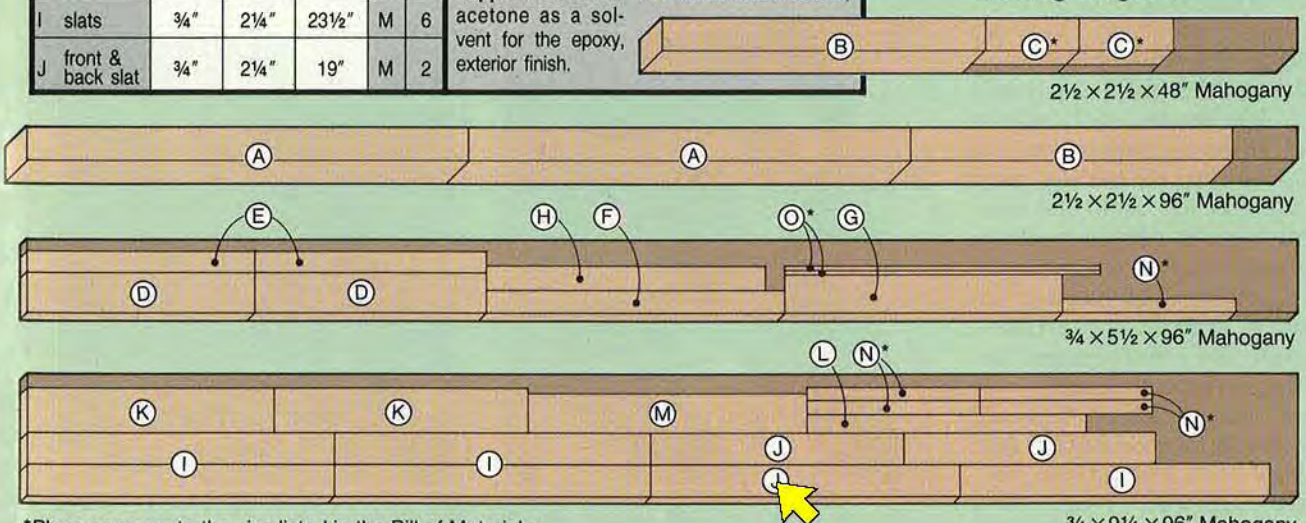
Parts		Finished Size* T	W	L	Matl.	Qty.
A	rear legs	2½"	2½"	33¼"	M	2
B	front legs	2½"	2½"	24¼"	M	2
C*	curved sections	1 9/16"	2½"	6⅛"	M	2
D	rails	¾"	3"	17¼"	M	2
E	rails	¾"	1½"	17¼"	M	2
F*	stretcher	¾"	1½"	21½"	M	1
G	support rail	¾"	3"	21"	M	1
H	support rail	¾"	1¾"	21"	M	1
I	slats	¾"	2¼"	23½"	M	6
J	front & back slat	¾"	2¼"	19"	M	2
K	armrests	¾"	3¼"	18¾"	M	2
L	backrest bottom rail	¾"	1¼"	21"	M	1
M	backrest top rail	¾"	3"	21"	M	1
N*	splats	¼"	1 1/16"	13"	M	9
O*	spacers	¼"	½"	15/16"	M	20

*Initially cut parts marked with an * oversized. Then, trim each to finished size according to the how-to instructions.

Material Key: M-mahogany

Supplies: #8×1¼" F.H. wood brass screws, acetone as a solvent for the epoxy, exterior finish.

Cutting Diagram



*Plane or resaw to the size listed in the Bill of Materials

Continued

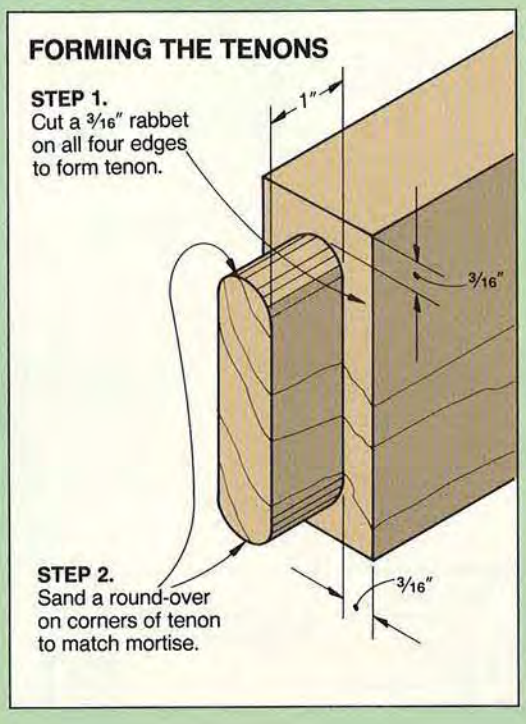
rest drawing for the tenon size, cut the tenon on the back end of the armrests (K). Now, using the details on the Exploded View drawing for tenon sizes, cut a tenon on both ends of the backrest bottom and top rails (L, M).

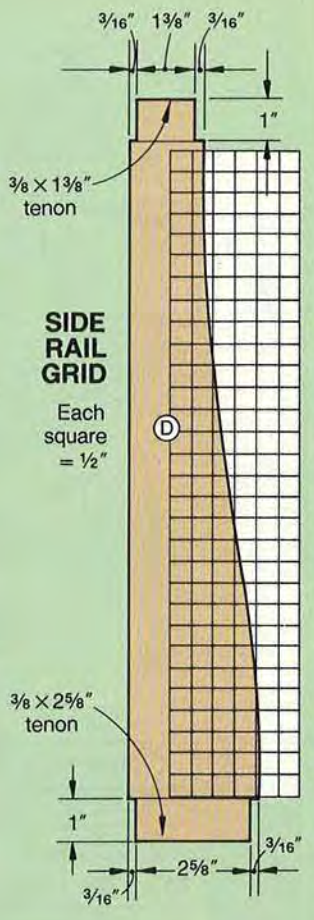
3 Cut a ¾" dado ⅜" deep in each lower rail (E) where shown on the Exploded View drawing.

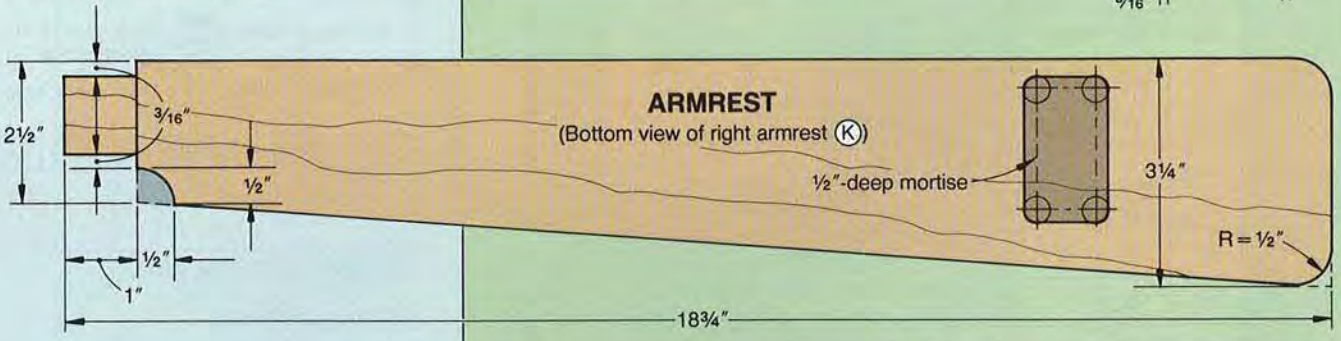
4 Cut the seat rails (D) to shape, using the Side Rail grid as a guide.

5 Cut the armrests to final shape, using the Armrest drawing *below* for reference.

6 Rout ⅜" round-overs along the top edges of the backrest top rail (M). Then, mark and cut a ½" radius on each top corner of the backrest top rail (see the Backrest Top Rail detail accompanying the Exploded View drawing for reference). Sand each radius smooth with a 1" drum sander.







Assemble the end sections

1 Dry-clamp the legs (A, B/C) and rails (D, E). Square each assembly, and slide the tenon on the armrest (K) into its mating mortise in the rear leg. Hold the armrest firmly against the tenoned top of the front leg, and mark the location of the mortise needed on the *bottom* side of the armrest. Repeat with the other armrest. Remove the armrests, leaving the rest of the assembly dry-clamped.

2 To form the mortise on the *bottom* side of each armrest, use a ⅜" flat-bottomed bit (we used a Forstner), and drill a ½"-deep hole at each corner of your layout

To safely cut the short spacers, use the eraser end of a pencil to clear the spacers from the blade.

Brush epoxy into the groove in the backrest lower rail, and then add the spacers and splats.

lines. Now, drill overlapping holes to remove stock, and chisel each mortise clean.

3 Check the fit of the armrests on the dry-clamped end sections. Again, remove the armrests; you'll add them later after you have attached the seat slats.

4 Glue and clamp each end section, checking for square.

Complete the frame, and build the backrest

1 Dry-clamp the support rails (G, H) and backrest top and bottom (L, M) between the end assemblies. Check for square. Remove the clamps and disassemble.

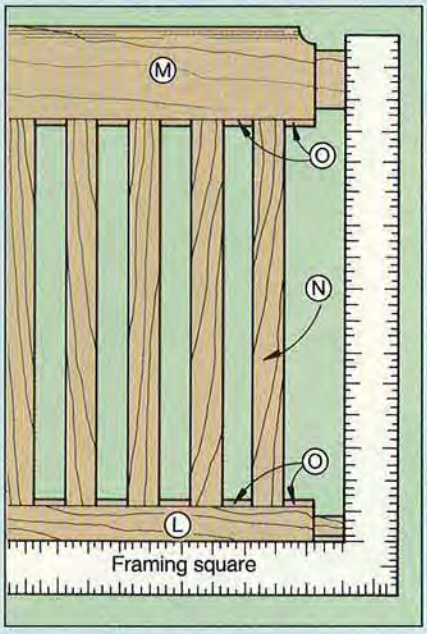
2 Using the Backrest Top Rail detail on the Exploded View drawing as a guide, cut a ¼" groove ⅜" deep centered along the top edge of the backrest bottom rail (L) and along the bottom edge of the backrest top rail (M). (We cut the grooves on the tablesaw fitted with a ¼" dado blade. To keep the pieces firmly against the fence, we used a feather board.)

3 Rip five strips 1 1/16" wide by 13" long from ¾" mahogany stock. Now, resaw each strip to obtain two ¼ × 1 1/16 × 13" strips for the splats (N).

4 To form the spacers (O), start by cutting two strips ¼ × ½ × 24". Rout or sand an ⅛" round-over along one edge of each strip. To prevent the pieces from falling into the gaps in the insert around the saw blade, cover the area with masking tape. Next, clamp a scrap block to the fence about 2" in front of the blade. Raise the saw blade ⅜" above the saw table. Position the fence so the block is 15/16" from the inside edge of the blade. Using your miter fence for support, slide one end of one of the strips against the block. Push the piece over the blade to cut a spacer, and move the spacer away from the blade with the eraser end of a pencil as shown in the photo *bottom left, opposite page.*

5 Starting at one end with a spacer, epoxy the spacers and splats into the ¼" groove in the bottom rail as shown in the second photo on the *opposite page.*

6 Once you have all the spacers and splats in position in the bottom rail, apply epoxy to the groove in the top rail. Lay the bottom-rail splat assembly flat on a work surface, and add the top rail to the ends of the splats. Epoxy the spacers in place. With a framing square, check that the splats are square to the rails and that the ends of the tenons are aligned. Wearing vinyl gloves to protect the skin, immediately wipe off excess epoxy with a cloth dampened with acetone.



Assemble the chair and add the finish

1 Epoxy and clamp the support rails (G, H) and the backrest assembly between the end sections, checking for square. Measure the distance between the dadoes in the lower rails (E), and cut the stretcher (F) to fit. Epoxy the stretcher in place.

2 Using the Screw Hole detail accompanying the Exploded View drawing for reference, drill plug and shank holes through the seat slats (I, J).

3 Rout a ¼" round-over along the top edges (not ends) of each seat slat. Clamp the front slat (J) to the chair, centering the predrilled screw holes over the front support rail (G). Drill pilot holes into the seat rails (D), and screw the front slat in place.

4 Cut two strips of scrapwood to ¼" thick for use as spacers. Working towards the back, space the slats (I) ¼" apart with the scrap spacers, and screw the slats to the top seat rails (D). Locate the rear slat (J) and screw it in place.

5 Plane a piece of mahogany to a 5/16" thickness and cut sixteen ⅜"-diameter plugs from it. With the grain direction on the plugs going in the same direction as the slats, plug the screw holes and sand the plugs flush.

6 Epoxy and clamp the armrests (K) in position.

7 Sand the entire chair smooth. Stain and finish as desired. (For the first coat, we sprayed on spar varnish—reduced 25 percent with mineral spirits. After this dried, we lightly sanded with 320-grit sandpaper, and then applied two additional coats full strength.) To prolong the life of the finish, store the pieces indoors (under cover) over the winter months. Also, if you happen to dent or scratch the finish, touch up the blemish with spar varnish to prevent moisture from getting under the finish.

Buying Guide

• Tropical hardwood epoxy. Slow-set epoxy, one 16-oz. can of resin, one 16-oz. can of hardener, and instructions. $27 ppd. Smith & Co., 5100 Channel Ave., Richmond, CA 94804. Or, call 800-234-0330 to order.

Produced by Marlen Kemmet
Project Design: James R. Downing
Photographs: Hopkins Associates
Illustrations: Kim Downing; Mike Henry

Print this article

CORDLESS

INNOVATIONS GALORE

Since we last reported on cordless drills in the June 1986 issue of *WOOD*® magazine, these machines have changed dramatically. Now, most have variable speeds, greater power, faster charging, and keyless chucks—improvements that have greatly increased the practicality of battery-powered drills for the home woodworker.

However, the traditional benefits of these handy tools haven't changed. Go-anywhere portability, freedom from cord hassles, and electrical safety still make cordless drills a smart investment. Small wonder that cordless products (primarily drills) represent the fastest growing product segment in the power-tool industry.

Today, you can choose from hundreds of cordless drills, but we limited our tests to 18 of the newest and best-selling models. This way, we were able to thoroughly test and evaluate every tool. Here's what we learned:

Power: How much do you really need?

Cordless drills get their power from a set of rechargable nickel-cadmium (ni-cad) battery cells encased in a removable plastic pack. The pack clips partially or completely into the tool handle. Each cell delivers 1.2 volts, so cordless products have voltages ranging from 2.4 volts (two cells)

Milwaukee 0399-1 (we added a Jacobs keyless chuck)

Panasonic EY 6205

WONDERS

DISTINGUISH A NEW ERA IN BATTERY-POWERED DRILLS

to 24 volts (20 cells). For this story, we tested models with voltages of 7.2, 9.6, and 12. For a look at the inside of a battery pack, see the photo at *right.*

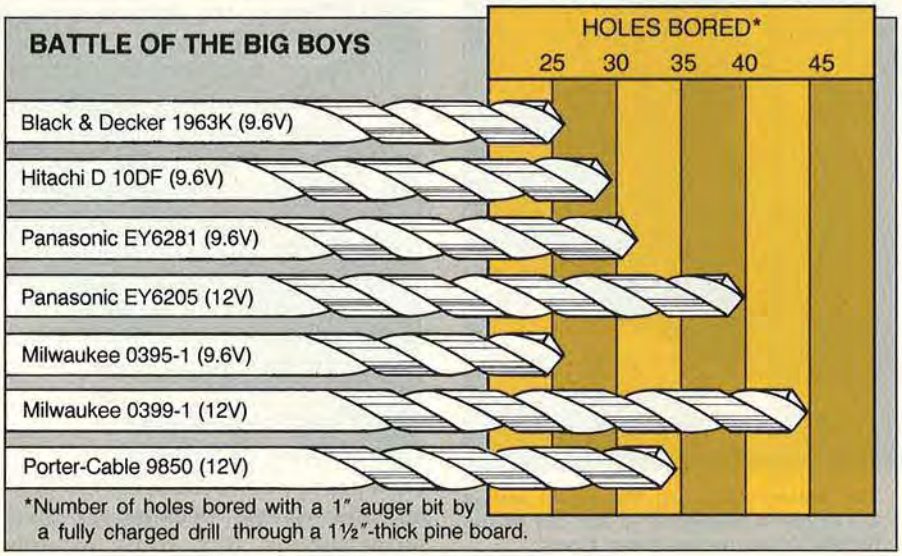
Before you decide on an individual model, it makes sense to determine how much power you really need, and then steer clear of drills that exceed your requirements. Why? You'll pay $15–$30 more for every 2.4-volt jump in comparable models. And, batteries account for about 30 percent of the tool's weight.

In our tests, the 7.2-volt drills proved powerful enough for most woodworking tasks. All were capable of driving 3″ deck screws, and drilling ⅝″ holes through 2″-thick red oak. As you can see by looking at the chart on page 67, all the 12-volt models bored 1″ holes in oak stock. But really, how many times do you call on your cordless drill for such tasks?

High voltage does have its advantages, though, such as added power storage. As shown in the test results at *right,* conducted with some of our favorite 9.6V and 12V models, the 12V machines bored 5–10 more 1″ holes per charge than the 9.6V tools. But, we would rather buy the lower-voltage tool and plow our savings into an extra battery pack ($30-$50). That way, we can keep a fresh battery on hand.

Continued

During battery-pack assembly, a worker adds a small thermostat that tells a charger when to stop charging, preventing any damage to the battery cells.

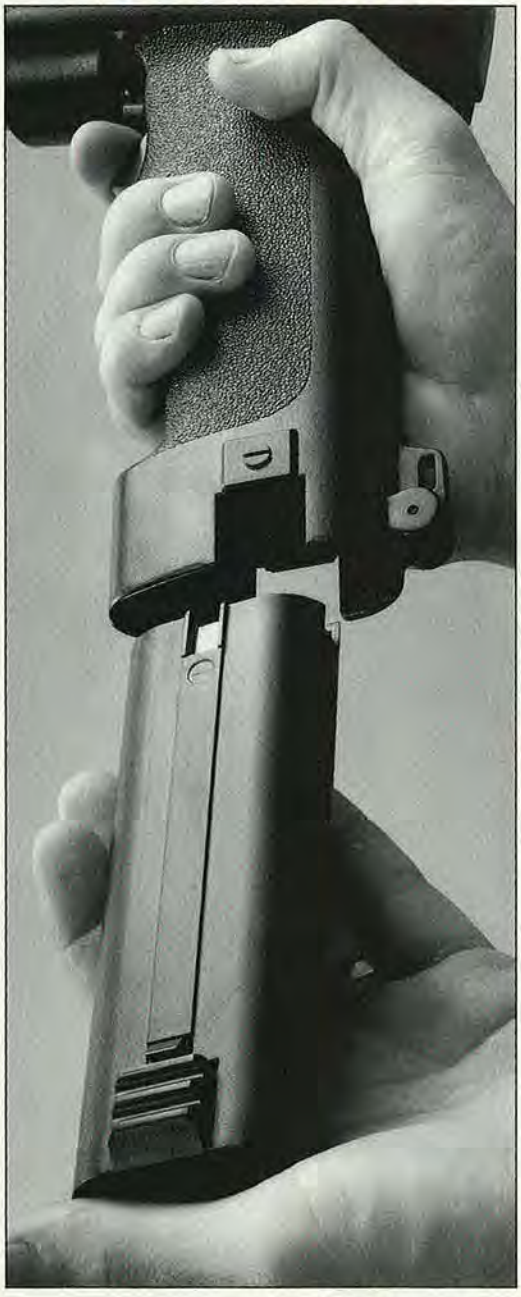


Porter-Cable 9850

AEG ABSE 15

Skil 2735

Ryobi TFD 220 VR



The battery pack on the Sears model 11128 had a tendency to fall out of the handle when the tool was jarred.

Handle size and position: vital to your comfort

Most of the drills in the test have slim handles that you can wrap your hand around. A few—such as the Ryobi BD-1020CVR, Makita 6093 DW, and Sears 27132 and 11128—have fat handles. These models, as shown by the Sears 11128 at *left*, have long battery packs contained entirely in the handle. We found these tools harder to grip than models such as the Hitachi D 10DF on page 62, which has most of the battery pack clipped below the handle.

Handle position also influences comfort. Inline-style drills have handles at the rear of the machine. Other models, known as T-handle drills, have handles located closer to the middle of the drill. We prefer the T-handle for most drilling tasks because it makes the machine less nose heavy, thereby improving balance. These tools also put your hand closer to the drilling action, increasing your control.

However, the inline drills have an advantage if you frequently drive long screws or bore large holes. These models allow you to put full forward pressure directly in line with the drill bit with one hand. When taking on heavy-duty tasks with a T-handle drill, you hold the drill with one hand and apply pressure to the rear of the drill with your other hand.

Clutches: nice if you drive a lot of screws

As a group, cordless drills excel at turning screws because of their slow speeds. But, some models have clutches that add even more control to screw-driving tasks. With these, the clutch slips at predetermined torque levels, preventing you from burying screws in the workpiece or snapping off screwheads. All of the clutches have a drill-only position that bypasses the mechanism.

Most clutches adjust easily with a nose-ring control located just behind the drill's chuck (see the photo at *right*). However, we noticed that some drills such as the Skil 2735 and Ryobi BD-1020CVR have clutch controls on the underside of the body. These dials proved less convenient because you have to turn the drill upside down to make an adjustment.

Keyless chucks: a great way to go

Of the drills tested, only the Hitachi, Panasonic, and three of the four Ryobi models came with keyless chucks. However, nearly all power-tool manufacturers were putting keyless chucks into their product lineups as this story developed. In short, we love these new chucks. With one of them on the business end of your drill, you'll never waste any time looking for a lost key. When it comes time to change a bit, just grab one of the chuck's two rings in each hand as shown on the *opposite page top*, and give a twist.

To our pleasant surprise, the Hitachi, Ryobi, and Panasonic chucks, as well as an aftermarket keyless chuck made by Jacobs, actually have more gripping strength than the keyed variety. As a test, we clamped a 12" long,

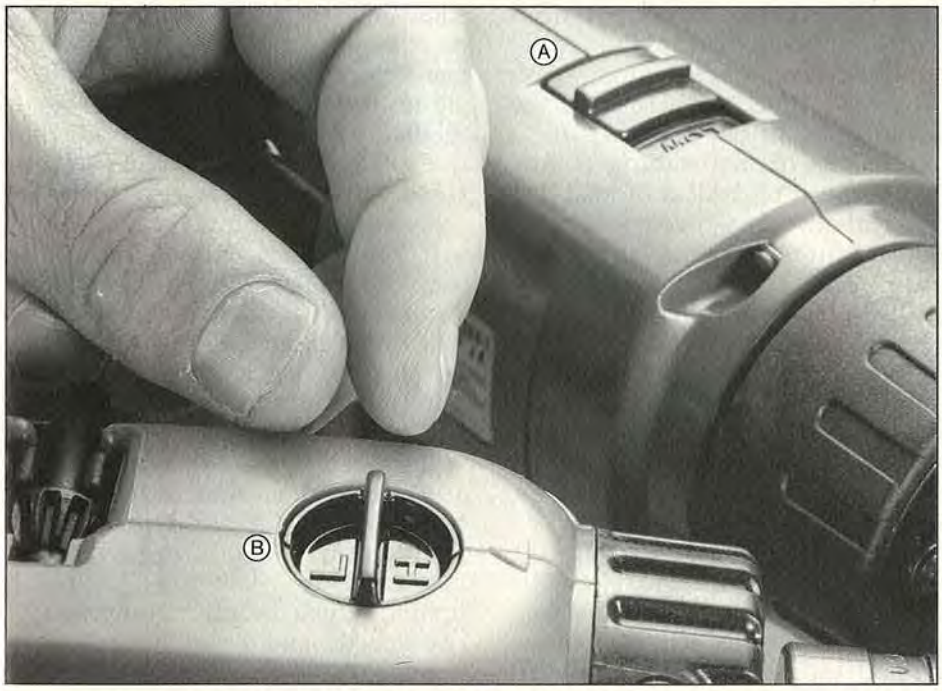
Bosch 3050 VSR

Black & Decker 1963K

Metabo O103

Ryobi TFD 170 VR

The keyless chuck (A) of the Hitachi D 10DF worked smoothly and effortlessly. The clutch control (B) helped make driving screws a breeze.



In our tests, sliding gear-reduction switches (A) worked smoother and quicker than rotating switches (B).

3/8"-diameter steel rod into a metalworker's vise, then chucked the other end of the rod into each drill and squeezed the trigger. The rod slipped inside the keyed chucks. The keyless chucks grabbed the rod so tightly that it spun inside the vise. After the tests, the keyless chucks let go of the rod with a firm, but not Herculean, twist.

Of the keyless chucks, we especially liked Panasonic's version because it opens and closes completely in only four revolutions. The other keyless versions require more than 20 revolutions.

You can buy keyless chucks as an accessory from many of the cordless drill manufacturers, or call Jacobs at 800-826-8066 or 803/654-5926 for the location of your nearest dealer. The Jacobs keyless chuck sells for $17.99 list.

Geared speed changers: some smoother than others

Most drills costing more than $100 have two speed ranges of about 0 to 400 rpm and 0 to 1,000 rpm. Because the speed changes mechanically through a series of gears, rather than electronically, the tools have more driving torque in the lower range.

Among the different models tested, we liked those that have slide switches such as the Milwaukee 0395-1 shown in the photo at *left*. One flick of your finger does it. All of the drills with a red dot under the heading "gear-reduction switch" in the chart on page 67 have similar smooth-working mechanisms.

Continued

Makita 6093 DW

Sears 27132

Panasonic EY 6281

Milwaukee 0395-1

CORDLESS

Those models with a green dot in that column have switches that got stuck between the speed ranges. To complete the speed change, we had to turn on the drill briefly to mesh the gears. The Makita 6093 DW earned a "poor" rating in this category because we had to squeeze our fingers into its small, recessed, rotating switch as shown on the previous page. Once grasped, the switch was difficult to turn.

Reversing switches: handiness counts

These mechanisms were judged according to the ease with which we could switch between forward and reverse without releasing our grip on the drill. Of all the tools, the Panasonic models were tops. As shown at *right*, a button emerges from one side of the drill or the other as you switch between forward and reverse.

A few recommendations about accessories

Only three of the tested drills—the Bosch 3050 VSRK, the Sears 27132, and the Skil 2735—come standard with an extra battery. Batteries cost between $30–$50 each, so keep this in mind as you compare prices.

You can purchase many cordless drills with or without a carrying case. This accessory might be worth the extra cost if you do a lot of traveling with your tools.

Which one to buy?

Although TVs and radios have made Panasonic and Hitachi well-known brands, these electronics giants could become just as famous for cordless drills. Both companies make well-balanced drills with smooth-working switches and keyless chucks. Along with the AEG ABSE 15, these were the only drills in our test that did a good job of maintaining a constant speed regardless of load. For our money, the 9.6-volt units with 60-minute chargers—the Panasonic EY 571B and the Hitachi D 10DF—have plenty of power and rate as excellent buys.

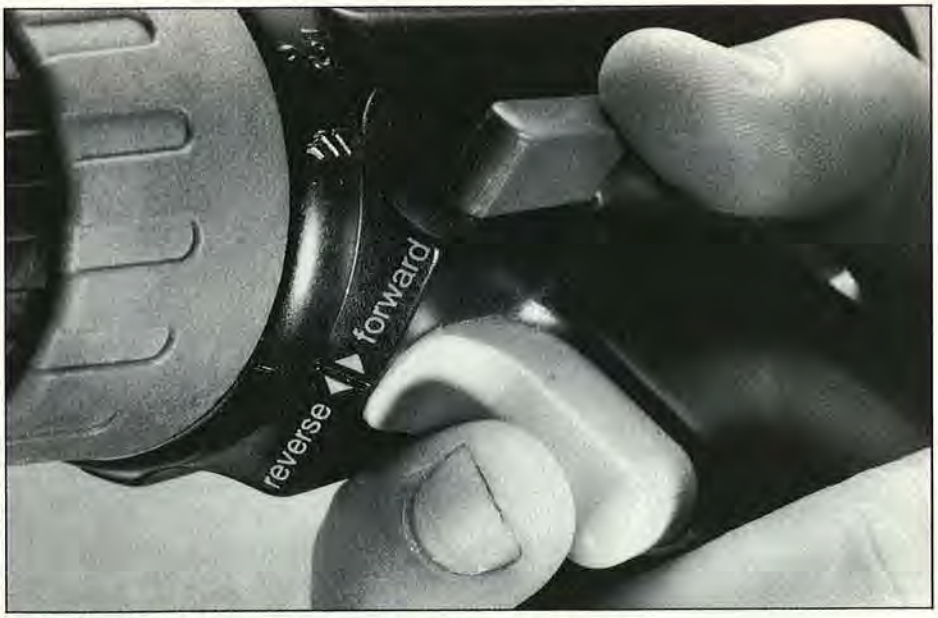
Several other drills also rate as good buys. All of the Milwaukee tools have excellent features and plenty of power, too, and they're in the same price range as the Panasonic and Hitachi units.

Even though we didn't like some features on the Makita 6093 DW, people who repair all makes of cordless drills tell us that no brand tops Makita for reliability. As one repairman said, "They just don't come back." And, of the tested drills, only seven of them—the Makita 6093 DW, both Panasonic models, three of the Ryobi models, and the AEG ABSE 15—have electric brakes. This feature allows the tool to come to an immediate stop when you release the ON/OFF button, saving you time and helping you drive screws to precise depths.

If you want maximum power for your dollar, the Porter-Cable 9850 costs less than any other 12-volt drill (about $145). This tool doesn't have two speed ranges, but Dennis Huntsman of Porter-Cable tells us a two-speed version will be on the market in early 1991. Repairmen told us this tool ranked high in reliability, too.

In the under-$100 category, we like the Skil 2503. This 7.2-volt drill charges in one hour, has two speeds, and a clutch.

Written by Bill Krier
Technical Consultant: Bob McFarlin
Photographs: Hopkins Associates; Gates Energy Products



Panasonic drills have easy-to-reach reversing switches.

21 CORDLESS DRILLS: HOW THEY STACK UP

MANUFACTURER	MODEL	VOLTS	BATTERY: CHARGE TIME (MIN.)	BATTERY: REMOVABLE (Y, N)	BATTERY: NO-LOAD SPEED(S) (RPM)	KEYLESS (Y, N)	CHUCK: KEY LOCATION[1]	CHUCK: CLUTCH (Y, N)	CUTTING CAPACITY[2]: 2"-THICK RED OAK	CUTTING CAPACITY[2]: 2"-THICK PINE	PERFORMANCE EVALUATION[3]: BALANCE	PERFORMANCE EVALUATION[3]: HANDLE SIZE AND LOCATION	PERFORMANCE EVALUATION[3]: REVERSING SWITCH	PERFORMANCE EVALUATION[3]: GEAR-REDUC. SWITCH	PERFORMANCE EVALUATION[3]: CLUTCH	PERFORMANCE EVALUATION[3]: CHUCK	PERFORMANCE EVALUATION[3]: CHUCK KEY ACCESSIBILITY	STANDARD EQUIP.[4]	LENGTH[5]	WEIGHT OF DRILL (LBS.)	COUNTRY OF ASSEMBLY[6]	LIST PRICE	SELLING PRICE[7]
AEG	ABSE 15	12	60	Y	0-370; 0-1000	N	BH	Y	1	1	●	●	●	●	●	●	●	CC	8	3.5	G	399	300
BLACK & DECKER	1963K	9.6	60	Y	0-350; 0-1200	N	TB	N	¾	1	●	●	●	●	None	●	●	CC, SB	6½	3.8	US	231	159
	9016	7.2	180	N	0-600	N	BH	N	½	½	●	●	●	None	None	●	●	SB	5¼	2.2	US	112	69
BOSCH	3050 VSRK	9.6	60	Y	0-400; 0-900	N	SB	Y	⅝	¾	●	●	●	●	●	●	●	CC, EB SB	7¾	3.4	US	235	145
HITACHI	D 10DF	9.6	60	Y	0-400; 0-1,100	Y	None	Y	1	1	●	●	●	●	●	●	None	CC	4½	3.7	J	292	160
MAKITA	6093 DW	9.6	60	Y	0-400; 0-1,100	N	SB	Y	⅝	1	●	●	●	●	●	●	●	CC, SB	6¾	3.7	US	261	140
METABO	0103	9.6	60	Y	350; 1,000	N	TB	Y	¾	1	●	●	●	●	●	●	●	SB	7¾	3.7	G	266	250
MILWAUKEE	0399-1	12	30	Y	0-350; 0-1,000	N	SB	Y	1	1	●	●	●	●	●	●	●	CC	6¼	3.8	US	290	170
	0395-1	9.6	30	Y	0-350; 0-1,000	N	SB	Y	1	1	●	●	●	●	●	●	●	CC	6¼	3.7	US	264	155
	0385-1	7.2	60	Y	0-600	N	SB	N	½	¾	●	●	●	None	None	●	●	CC	5¾	2.5	US	174	120
PANASONIC	EY 6205	12	15	Y	50-350; 150-1,000	Y	None	Y	1	1	●	●	●	●	●	●	None	SB	4¼	4.1	J	387	220[8]
	EY 6281	9.6	15	Y	50-350; 150-1,000	Y	None	Y	1	1	●	●	●	●	●	●	None	SB	4¼	3.6	J	347	200[8]
PORTER-CABLE	9850	12	60	Y	0-400	N	BH	Y	1	1	●	●	●	None	●	●	●	CC, SB	6½	3.9	US	230	145
RYOBI	BD-1020 CVR	7.2	60	Y	0-300; 0-600	N	SB	Y	⅝	1	●	●	●	●	●	●	●	SB	5¾	3.4	T	189	120
	TFD 150 VR	7.2	60	Y	0-300; 0-1,100	Y	None	Y	1	1	●	●	●	●	●	●	None	SB	7½	3.4	HK	212	110[9]
	TFD 170 VR	9.6	60	Y	0-400; 0-1,200	Y	None	Y	1	1	●	●	●	●	●	●	None	SB	8	3.8	HK	270	140[9]
	TFD 220 VR	12	60	Y	0-400; 0-1,300	Y	None	Y	1	1	●	●	●	●	●	●	None	SB	8	4.1	HK	303	160[9]
SEARS	27132	9.6	60	Y	0-600	N	SB	Y	⅝	¾	●	●	●	None	●	●	●	CC, EB	4¾	3.1	US	None	148.71
	11128	7.2	60	Y	0-600	N	SB	Y	⅝	¾	●	●	●	None	●	●	●	--	4¾	2.8	US	None	78.95
SKIL	2735	12	60	Y	0-500; 0-1,650	N	BH	Y	1	1	●	●	●	●	●	●	●	CC, EB	6¾	4	US	210	155
	2503	7.2	60	Y	300; 600	N	BH	Y	¾	¾	●	●	●	None	●	●	●	CC	6¼	3.5	US	80	70

Ryobi
TFD 150 VR

1. (BH) Bottom of handle; (SB) Side of body; (TB) Top of body
2. Maximum hole diameter in inches
3. ● Excellent
   ● Good
   ● Fair
   ● Poor
   (See story for further explanation of criteria).
4. In addition to battery and charger. (CC) Carrying case; (EB) Extra battery; (SB) Screwdriving bit
5. From tip of chuck to trigger switch
6. (G) Germany; (HK) Hong Kong; (J) Japan; (T) Taiwan; (US) United States
7. Selling prices based on advertisements, catalogs, and dealer inquiries at time of article's writing.
8. Same models available with 60-minute charge as models EY 6005 (12V-$180) and EY 571B (9.6V-$150).
9. Same models available with 15-minute chargers.

MANUFACTURERS' LISTING

AEG
203/447-4600

Black & Decker
800/762-6672

Bosch
Look in your Yellow Pages under "tools"

Hitachi
404/925-1774

Makita
714/522-8088

Metabo
215/436-5900

Milwaukee
414/781-3600

Panasonic
201/348-5334

Porter-Cable
901/668-8600

Ryobi
803/226-6511

Sears
Call your nearest store

Skil
312/286-7330

EXHIBIT

This clever, inlay-adorned turning project has lots going for it. Not only does it make a terrific gift for anyone who has collectibles to showcase, it's also a snap to turn. And best of all, you can do it all for under $16.

Print this article

Form the base lamination, and cut it to shape

1 Rip and crosscut two pieces of ¾"-thick walnut to 8×8". With the edges and ends flush, glue and clamp together the two pieces as shown in the drawing at *right.*

2 Mark diagonals to find center on the *bottom* side of the walnut lamination. With a compass, mark one circle the same diameter as your faceplate (we used our 3" faceplate) and a second circle with a 3⅞" radius (7¾" diameter) where shown on the drawing at *right.*

3 Cut the walnut base to rough shape on a bandsaw.

4 Center your faceplate on the smaller-diameter circle, drill pilot holes, and screw your faceplate to the bottom of the lamination.

Turn the base to shape

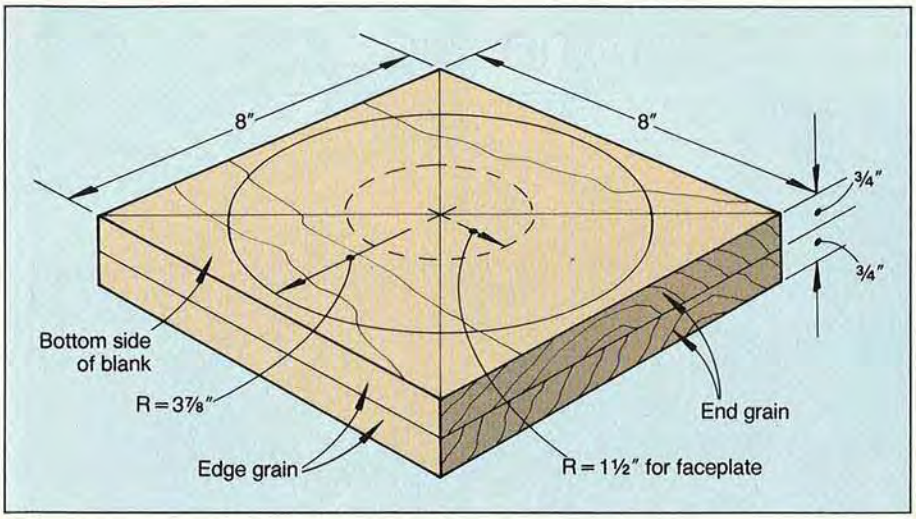
1 Turn the base to a 7⅜" diameter with a gouge and a lathe speed of about 750 rpm.

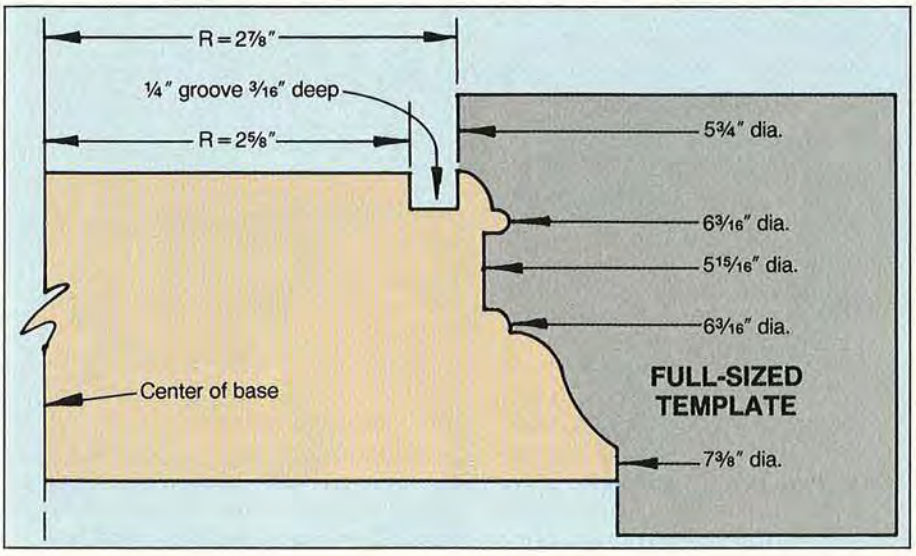
2 With the lathe running, find and mark the centerpoint on the top face of the walnut base with a pencil. Stop the lathe, and use a compass to mark the inside glass-groove radius (2⅝") and the outside glass-groove radius (2⅞"). (We set the compass, located the metal point at the marked centerpoint, and then turned the base by hand to mark the two concentric circles to locate the glass groove. See the Buying Guide for our source of the glass dome.) Center the dome between the marked lines to ensure the correct groove location.

3 Use a parting tool to form a ¼" groove 3/16" deep. (We cut our groove slightly oversized; a tight fitting dome can crack if the base expands or contracts.) Check the fit of the dome in the groove.

4 Transfer the full-sized template pattern shown *above right* to posterboard. Cut the template to shape (we used an X-acto knife). Using the template as a guide, turn the

UNDER GLASS





Stop the lathe frequently when turning the inlay-border groove with the parting tool to check the fit of the inlay.

base to shape, checking the diameters with an outside calipers. (We used a ⅜″ bowl gouge and a parting tool to shape the edge of the base). When forming the groove for the inlay border, stop and check the fit of the inlay in the groove as shown in the photo *above right.*

4 Sand the base smooth, being careful not to widen the groove for the inlay border.

Add the inlay border, and then apply the finish

1 Apply a thin, even coat of glue into the inlay-border groove. Working your way around the base, fit the inlay border into the groove and hold it firmly in place with masking tape. (We applied tape about every 2″.) With a hobby knife (again, we used an X-acto knife), cut the end of the border to fit snugly against the end already glued and taped in place. Wipe off excess glue with a damp cloth. Later, remove the masking tape and lightly sand the inlay smooth with 320-grit sandpaper.

2 Remove the base/faceplate assembly from the lathe, and then remove the faceplate from the base. With putty or a walnut dust and glue mixture, fill the screw holes in the base bottom. Apply several coats of clear finish to the base (we used spray-on lacquer), being careful not to get an excessive amount in the glass groove.

Buying Guide

● **Dome and inlay.** 5½″-dia. dome 11″ high and a 36″-long inlay border. Catalog no. A2738-01, $13.45 (U.S.) ppd. Mason & Sullivan Co., Dept. 2364, 586 Higgins Crowell Road, West Yarmouth, MA 02673. Call 508/778-1056 to order.

Project Design: James R. Downing Photographs: Bob Calmer; Jim Kascoutas Illustrations: Kim Downing; Mike Henry

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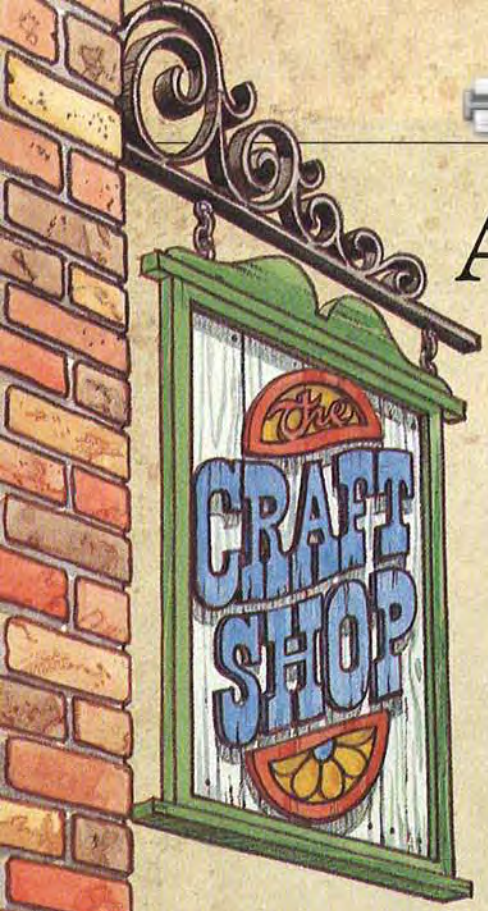
A WARM WELCOME
from the old Southwest



Hey pardner, don't let the hand-carved look of this sign fool ya. Any greenhorn can rout and chisel this ol' doggie in less than 30 minutes flat.

Cut two pieces of ¾"-thick, straight-grained, clear pine to 6" wide by 10" long. Glue and clamp the boards edge to edge with the surfaces and bottom ends flush. Later, scrape off the excess glue from the joint line and sand both surfaces smooth.

Using carbon paper, transfer the full-sized pattern to the wood. (For a bigger sign, enlarge the pattern on a photocopy machine with enlargment capabilities.) The bottom of the pattern should be 1" from the bottom edge of the lamination. Don't mark the detail lines; you'll add them later with a marking pen. Clamp the work piece to your benchtop or stick it with double-faced tape.

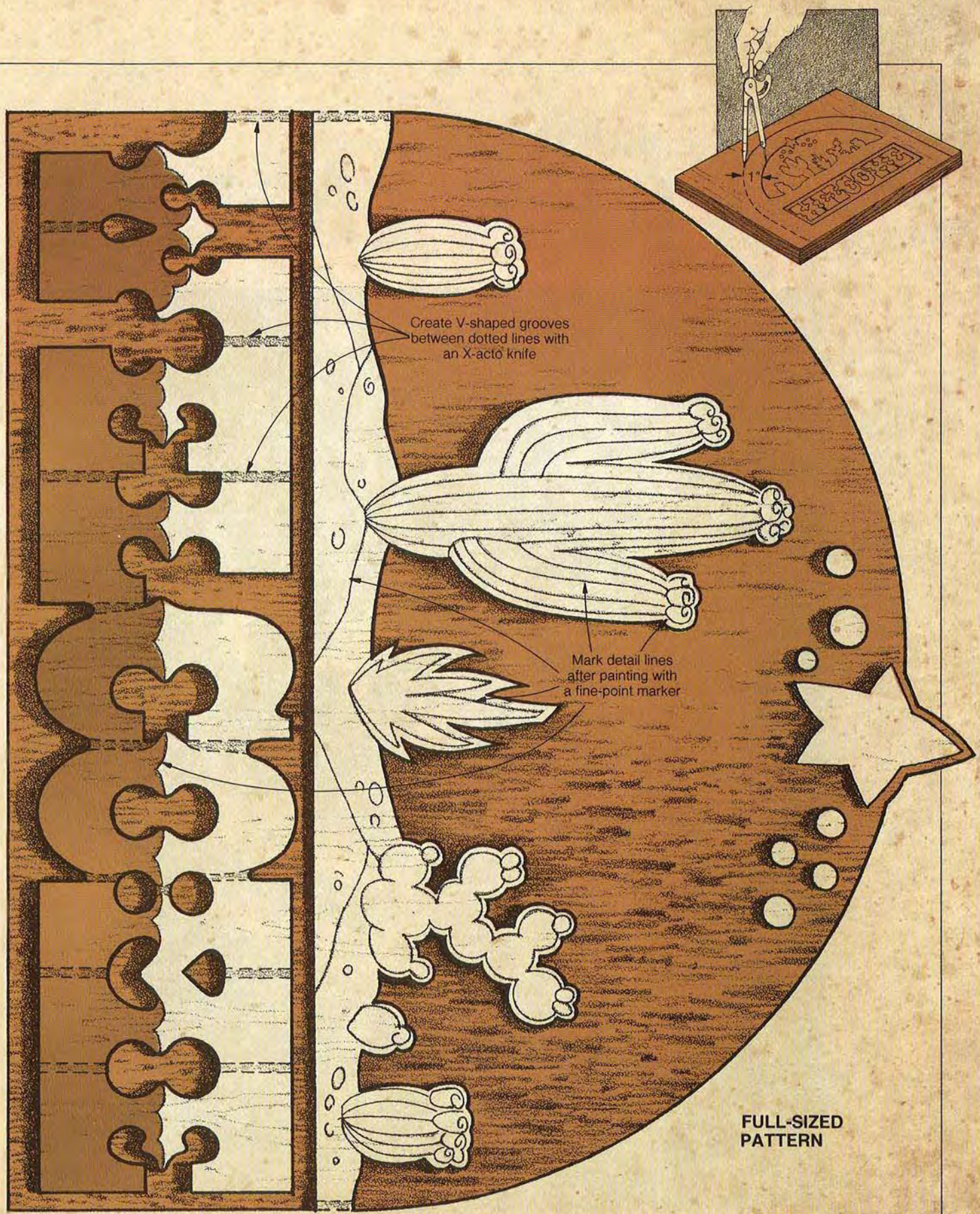
Chuck an ⅛" carbide-tipped straight bit into your router. Set the bit to cut 3⁄32" deep. Rout next to the straight lines and borders first. Then, rout around the letters, plants, ground, clouds, and star. Next, rout away the excess material inside the letters. For the areas too small to rout—those marked with a dashed line—cut a V-shaped groove with a crafts knife or a carver's V-parting tool.

Create the hand-carved look by roughing up the flat routed area between the cacti and star, using different-sized bench chisels. Mark a 1" border around the sign, as shown in the sketch *opposite page, top right.*

Cut the perimeter of the sign to shape. Sand the cut edge to remove the saw marks. Rout a ⅜" round-over along the front outside edges of the piece. Sand smooth, removing any remaining carbon-paper lines or routing marks. Stain the entire sign, working the stain into all small corners with a 1"-wide foam brush. Let the stain dry.

To paint the sign, apply enamel or acrylic paints with a fine-tipped brush (we used a #4 sable). Let the paint dry overnight. Depending upon the paint and desired finish, you may want to give the colored areas another coat of paint. After the paint has thoroughly dried, highlight the detail lines on the cacti, letters and ground—where shown on the full-sized pattern at *right*—with a fine-point, black, felt-tip, permanent marker. Don't worry about your highlight lines exactly matching ours; be creative. Spray the front and back of the sign with a clear finish. Drill a mounting hole at a slight angle or nail a sawtooth hanger on the back of the project and hang.

Project Design: Michael Mealey Photograph: John Heatherington Illustrations: Jamie Downing; Jim Stevenson


1"
Create V-shaped grooves between dotted lines with an X-acto knife
Mark detail lines after painting with a fine-point marker
FULL-SIZED PATTERN

Print this article

Stars-and-Stripes WREN HOUSE

To make the front and back (A), start by cutting a piece of ¾" stock to 5½" wide by 14" long, bevel-ripping the edges at 45°. Next, cut two 6½"-long pieces from this board. Place these two pieces on a flat surface, beveled edges down, and lay out the roofline on each (see the Exploded-View drawing for dimensions). Make the roof cuts.

For the sides (B), cut a piece of ¾" stock to 6" wide by 8" long, bevel-ripping the edges at 45°. From this piece, cut the sides to their 3¾" finished length.

Using ½" stock, cut the roof pieces (C) to 7¼" wide by 6" long. Bevel one end of each for a 5" finished length. Transfer the full-sized star pattern to ¼" stock, and cut the two stars to shape.

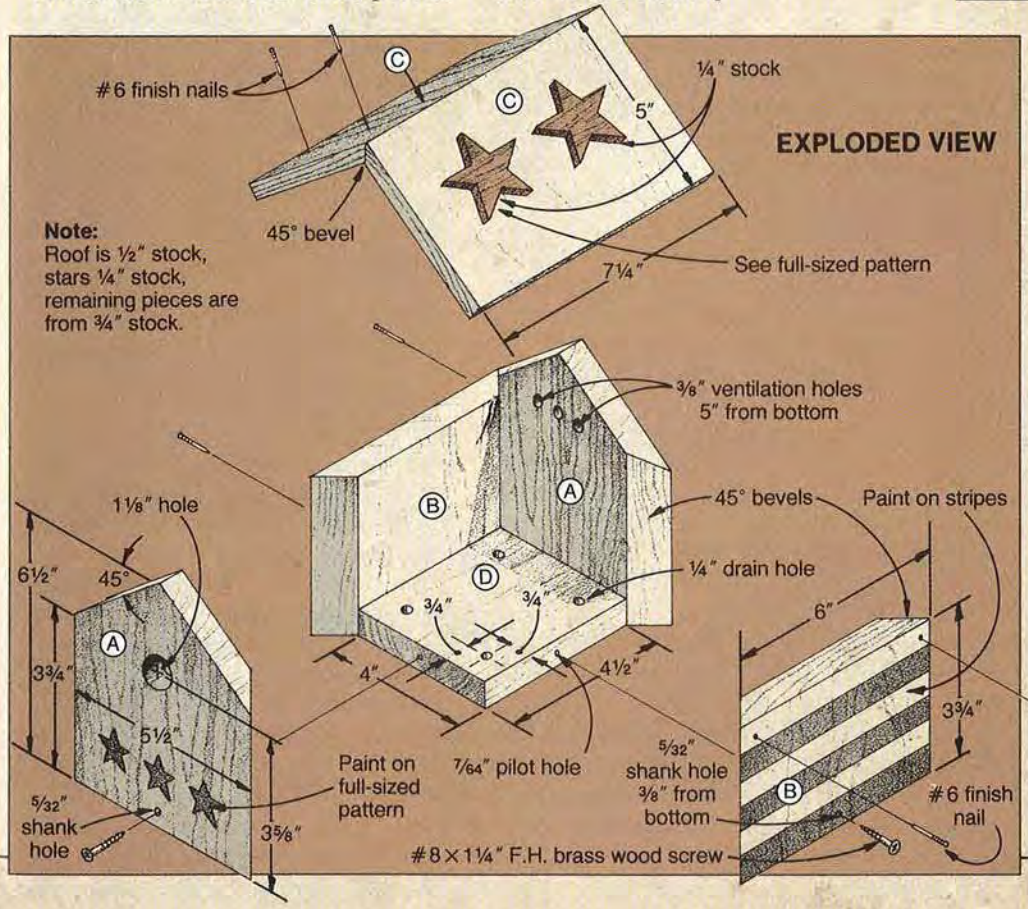
Drill three ⅜" ventilation holes in the back piece and a 1⅛" entrance hole (sized for wrens) in the front. With the bottom edges flush, glue and nail the sides between the front and back pieces. Measure the opening, and cut the bottom (D) to size, less 1/16" in length and width. (We made the bottom slightly smaller than the opening, and installed it with screws to make it removable for annual cleaning.) Drill a ¼" drainage hole in each corner of the bottom piece. Drill the shank and pilot holes, and screw the bottom in place.

Paint the house and two wooden stars antique white and the roof soldier blue. Allow the paint to dry. To paint the stripes on the side pieces, adhere ¾"-wide masking tape to the birdhouse, spacing the tape ¾" apart. Paint the stripes barn red. Transfer the full-sized small star patterns to the house front and paint them soldier blue.

Nail the roof pieces to the assembled house. To age the house, lightly sand the edges. Apply medium walnut stain to the birdhouse, and immediately wipe off most of it. Nail the stars to the one side of the roof.

To perch or not to perch

John Dennis, contributing editor to *Bird Watcher's Digest*, offers the following advice concerning perches: DON'T include them! A bird can easily land on the entrance hole and go into the nesting box from there. Decorating your birdhouse with a perch provides birds such as sparrows and starlings a vantage point from which they can take over the house for themselves. These mischievous birds have been known to destroy the eggs or kill the young nesting inside.



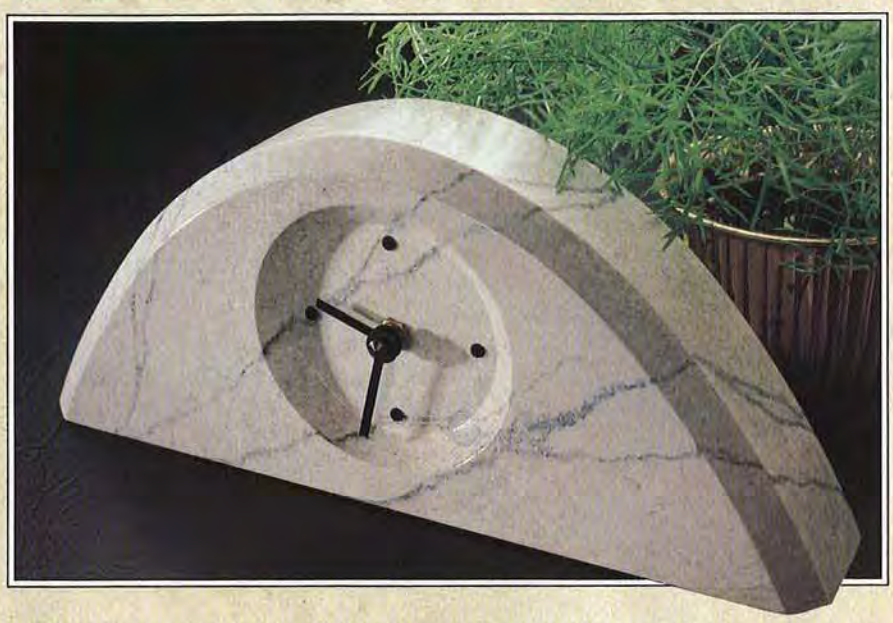
Project Design: Bob and Carolyn Reichert, 100% Pure Country, Waterloo, Iowa. Photograph: Hopkins Associates. Illustrations: Jamie Downing; Jim Stevenson

A mantel clock with classic good looks

MARBLEIZED MASTERPIECE

Coupled with our marbleizing technique on page 76, you can create this stately timepiece from the pauper of woods—particleboard. The finish looks so realistic that only the clock's light weight reveals its true identity.

Print this article



From ¾" particleboard, cut three pieces to 5¼" wide by 12" long. On each piece, mark a centerline between the ends, and then mark a line across the centerline 2⅜" from the bottom edge.

Chuck a circle cutter into your drill press, and position the blade where shown in the Cutter detail to cut a 2⅞" hole (we test-cut scrap to verify the hole size). Position one of the pieces of particleboard so the pilot bit centers over the marked centerpoint. Clamp it to the drill-press table, and bore a 2⅞" hole through it as shown in the photo at *right*. Adjust the cutter and cut a 3½" hole in each of the two remaining pieces.

Reverse the blade tip so it's on the inside (opposite of that shown in the detail), and then adjust the cutter and cut a 2⅞" plug. The plug should fit snugly into the hole in the clock. Enlarge the ¼" shaft hole in the plug to ⅜".

Spread an even coat of glue on the mating surfaces, and glue and clamp the three pieces face-to-face with the edges and ends flush. Check that the two 3½" holes align and that the 2⅞" hole is centered inside the 3½" hole. Use clamp blocks to prevent denting the particleboard. Later, remove the clamps and sand the bottom surface of the lamination flush.

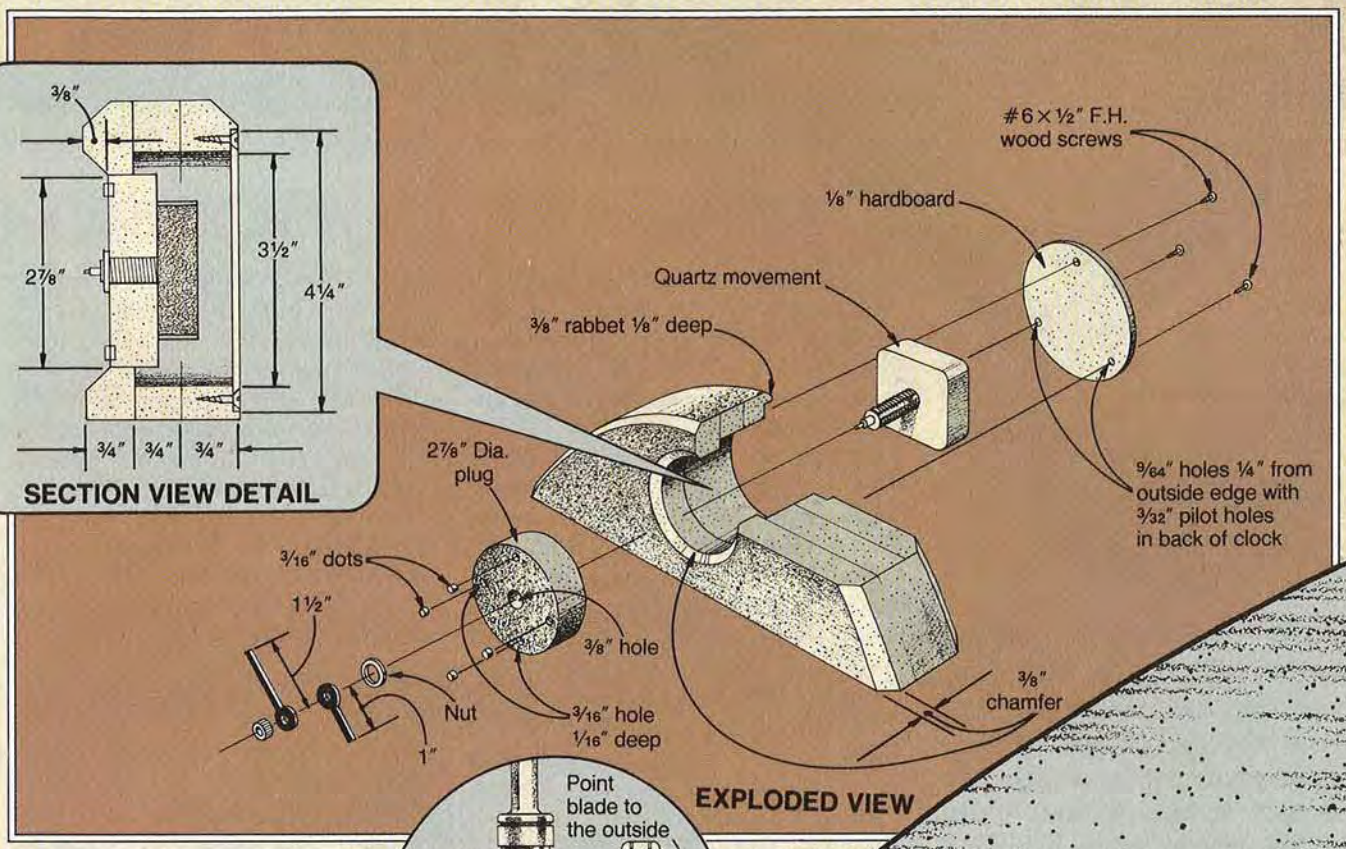
Transfer the half pattern at *right* to the front of the lamination. Turn the pattern end for end and lay out the other half of the shape. Bandsaw the perimeter of the clock to shape, cutting just outside the marked line. Now, sand to the line to finish the shaping.

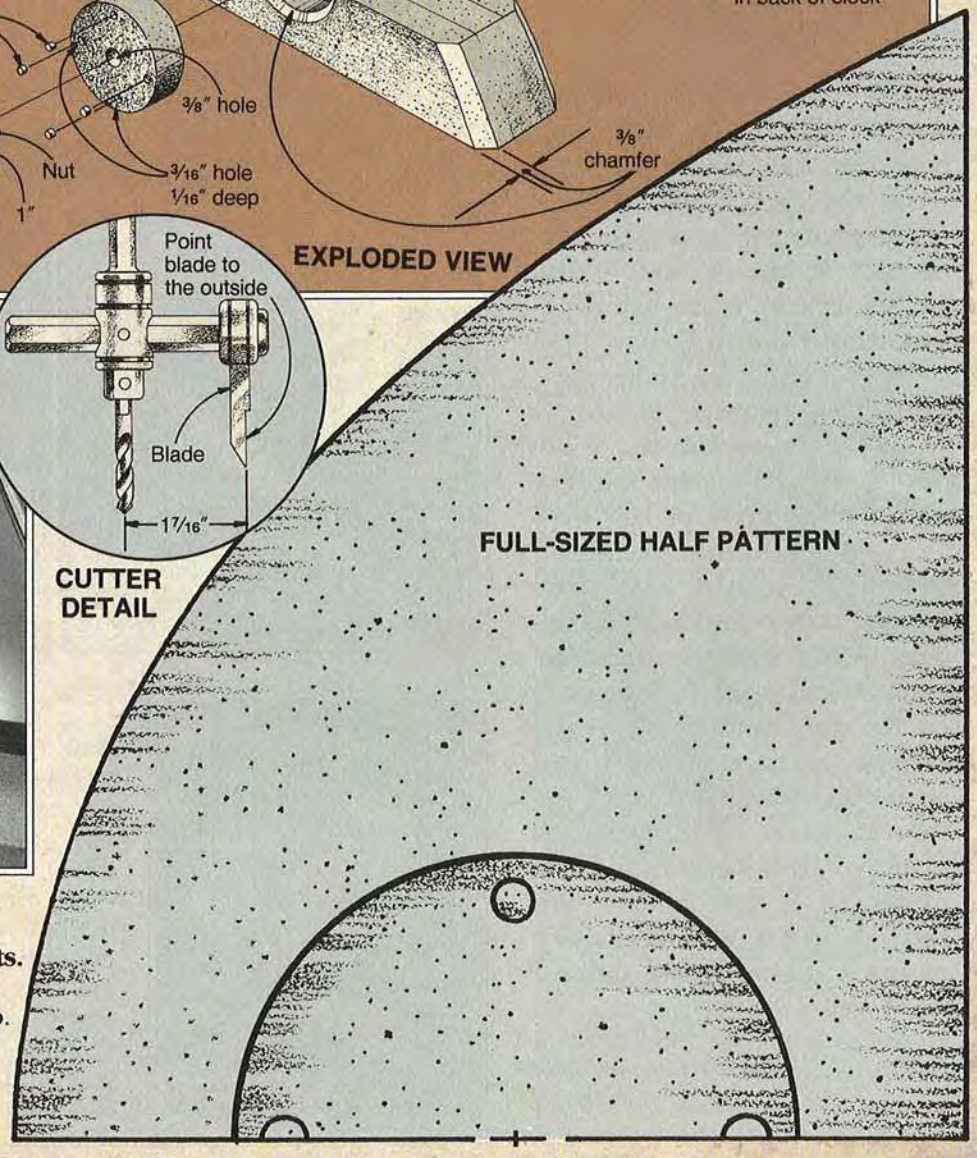
Rout a ⅜" rabbet ⅛" deep on the backside of the clock blank to house the ⅛" hardboard backing. Switch bits, and rout ⅜" chamfers on the clock where shown on the Exploded View drawing. Carefully mark the location of the four timing dots on the plug, and drill a 3⁄16" hole 1⁄16" deep at each mark. Glue the plug in place where shown on the Section View detail at *top right*, being careful to position the plug so that the 12 and 6 o'clock marks are straight up and down.

Using a compass, mark a 4 3⁄16" circle on a piece of ⅛" hardboard, and cut the piece to shape for the movement cover. Next, drill three 9⁄64" shank holes through the hardboard and 3⁄32" pilot holes in the back of the clock.

Fill the edges of the particleboard. (We used Durham's Rock Hard Putty.) Sand the clock body.

Marbleize the clock and backing—see pages 76—77 for how to do this. Add the timing dots and movement, and screw the hardboard back in place. Trim the hands to the lengths stated on the Exploded View drawing and add them to the clock shaft.



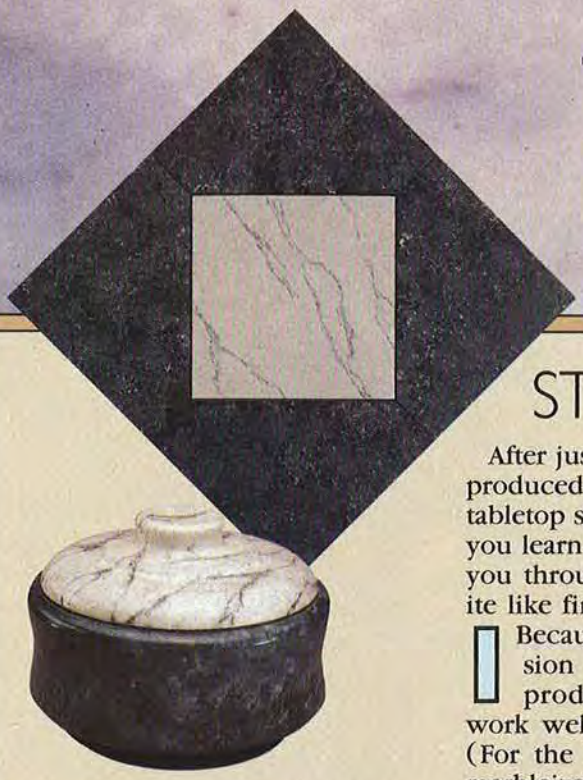


Buying Guide

● **Movement, hands, and dots.** Mini-quartz movement, black hands, and timing dots. Kit no. 71058, $9 ppd., Klockit, P.O. Box 636, Lake Geneva, WI 53147. Or, call 800-556-2548 to order.

Project Design: James R. Downing Photograph: Hopkins Associates Illustration: Jamie Downing; Jim Stevenson

They look so real you can't
PAINTED



STEP-BY-STEP TO A ROCK-SOLID

A few months ago, Chicago woodworker Bill Aitchison sent me the handsome little dish shown *above*. What's most impressive about this project, at least to me, is that he turned it from particleboard and painted it to look like marble and granite. As an experiment, I set the dish on my desk to see how many people it would fool. One after another, members of the *WOOD*® magazine staff picked up the dish, only to be amazed at its light weight and particleboard construction. When Bill told me that anybody could learn to perform this wood-into-stone magic in a few hours with fast-drying water-based paints, I had to know more.

Bill Kier

Products/Techniques Editor

Print this article

After just three practice pieces, I produced the granite-and-marble tabletop shown at *left above*. After you learn to marbleize, we'll walk you through the steps for a granite like finish.

Because of the strong adhesion qualities of water-based products, these procedures work well on most any material. (For the tabletop *above* and the marbleized clock on page 74, we chose particleboard because it cuts and shapes easily, and has a smooth surface.) After machining your pieces, be sure to fill all cut edges with putty as shown *below*, and sand flat the filled areas with 150-grit sandpaper.

2 With a high-quality nylon/polyester brush, apply successive coats of Amity white primer to the workpiece until the surface appears totally white (See the Buying Guide on page 78 for a source of supplies). Each coat should dry in about one hour, but we decreased the drying time to 15 minutes with the aid of a hair dryer set on *low* as shown *below*. Sand lightly between coats with 220-grit paper.

Bill Aitchison with a faux marble-and-granite tabletop.

Our master of deception

In his self-employed occupation as a refinisher/woodworker, Bill Aitchison has painted everything from metal doors to antique furniture, to look like everything from rough cedar to Italian marble. And, more than 30 years of experience have made him a real pro at this craft. Today, Bill passes along many of his secrets in two- and three-day seminars that cover 22 faux finishes. If you would like to attend such a seminar, give Bill a call at 708/422-4456.

tell the difference

STONE FINISHES

MARBLE LOOK

3 With a square stick of soft, compressed black charcoal, draw surface veins that look like concrete cracks or bolts of lightening. Draw the veins at a 45° angle across the surface as shown *below*. For a natural effect, apply light pressure to the charcoal, and try to shake your hand somewhat. Resharpen the charcoal stick now and then by dragging its tip across sandpaper.

This and the following two steps require some practice and patience, but your rate of improvement will amaze you. As you practice, pay attention to the pattern of the veins in the piece of genuine Palomino marble shown in the *bottom* photo.

4 Dip a piece of natural sponge with torn (not cut) faces into a shallow pan of Amity white primer, and lightly dab the entire work surface (in a random pattern) as shown *below*. The sponge will pick up some of the charcoal and spread it around the surface to blend the veins with the background. Lift the sponge straight up and down so you don't smudge the charcoal. Re-wet the sponge after 10 or 12 dabs.

5 Fold a clean cotton rag that has little pattern or "weave," (a worn diaper works fine) so it fits into your hand and has no wrinkles on its bottom side. With this pad, blot the entire surface as shown *below left* to further blend the charcoal and paint. Again, be careful to lift the rag straight up and down.

Note: *Because water-based paints dry quickly, don't waste any time between Steps 4 and 5. It helps to prefold the rag and set it aside before starting Step 4.*

6 After the paint dries, again dip the sponge into the white primer and sparingly dab small, random areas of the surface. Try to "bury" portions of the veins and lighten the larger white areas between the veins. This and the following step add depth and realism to the marble. Reblot the surface with a rag as described in Step 5.

7 Accentuate the veins by slightly darkening about half of them with charcoal as shown *below*. Lightly sponge and blot the surface as described earlier in Steps 4 and 5.

8 To make the surface look like polished marble, apply at least three coats of a gloss water-based finish such as Amity gloss lacquer. (For more information on water-based finishes, see page 42.)

Continued

PAINTED STONE FINISHES

GRANITE: THE PERFECT COMPLEMENT TO THE MARBLE LOOK

The granitelike effect shown on our tabletop makes a great border or trim for a marbleized surface. As you work, strive for a mottled look of black, gray, and white specks. We made the top on page 76 from five separate pieces for a realistic tiled look.

1 Prepare and prime the surface as described in Steps 1 and 2 in the marbleizing section. Into a shallow pan, pour separate pools (about 1 oz. each) of Amity black and white primer.

2 Dip a natural sponge into the black primer and lightly dab the entire surface as shown at *top left*. Apply the black randomly and sparingly, being careful to move the sponge straight up and down.

3 With some black paint still on the sponge, immediately dip it into the white primer and mix the two colors in another area of the pan as shown at *top right*. Dab the surface with this mixture as shown at *bottom right*.

4 Blot the surface as described in Step 5 of the marbleizing procedure. By this point, you should have a surface that appears to be a random mix of black, gray, and white specks. If you're not satisfied, just responge the surface.

5 Add a clear finish as described in Step 8 of the marbleizing technique.

Buying Guide

• **Faux stone kit,** including one pint each of black and white paints, natural sponge, and charcoal, $15. One quart of brushable clear lacquer (specify satin or gloss) $10.95. Add $5 postage per order. Call Amity at 800-334-4259 or 608/837-8484.

Written by Bill Krier Photographs: Hopkins Associates; John Hetherington

Print this article

THE DOUBLE-CRANK BRACE

THE TOOL THAT REVOLUTIONIZED DRILLING

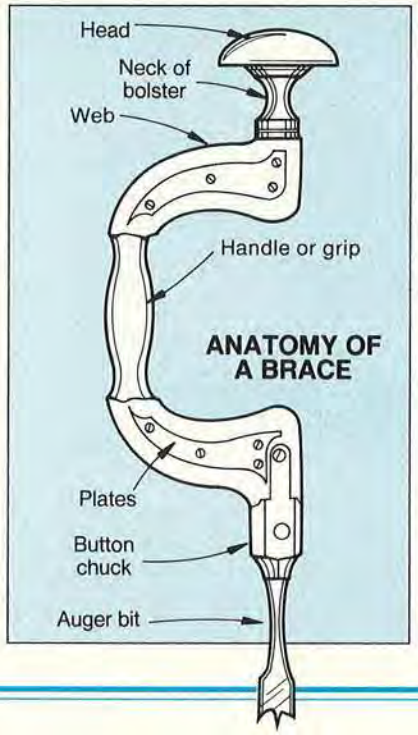
Left to right. James Howarth metallic-frame brace, brass with ebony, Sheffield, England, about 1860, $400; primitive American all-oak brace, late 17th or early 18th century, $100; American all-metal brace, factory made by John S. Fray Co. about 1900, $50.

Unlike many tools that evolved from crude predecessors, the double-crank brace mysteriously showed up in early 14th-century Europe as a tool unto its own. Some historians suggest that the Crusaders brought it from the Middle East.

Prior to the brace's appearance, woodworkers used slow-performing, T-handled augers to make large holes, and pump-and-bow drills for smaller ones.

A new concept is born

On some primitive braces, the head (see drawing, *right*) was sometimes a separate piece of wood that the driller strapped to his chest. More often, though, the head attached to the brace and turned independently. The pad, or socket, accepted the bit. However, even into the 17th century, the bit was permanently attached to the pad, so a tradesman needed to carry a brace (bitstock) for each size of hole.



Eventually, replaceable bit pads evolved, held in place by brace pressure on the workpiece. By the 1800s, other bit-security mechanisms were invented, including crude chucks with thumbscrews and push-button releases.

Brace bodies, at first made entirely of a stout wood such as beech, were reinforced by the addition of metal plates. Today, collectors call these plated braces.

In 1848, John Cartwright received a British patent for a beautiful and functionally improved brace. It consisted of a heavy, cast-brass frame fitted with wood, with a thrust bearing at the head, a metal chuck for interchangeable bits, and a rotating wrist. William Marples, a Sheffield, England, tool manufacturer, began offering the new brace in 1850, calling it the "Ultimatum." It certainly was. Made of ebony, boxwood, or rosewood, it cost 23 shillings, nearly the weekly wage for a carpenter at the time. Plain wooden braces cost a mere nine shillings.

Improvements by the score

As industrialization enveloped America, new ideas for the brace blossomed. In the second half of the 18th century alone, more than 300 brace designs and improvements were patented. Chucks and other mechanisms for holding bits were improved repeatedly. A monumental innovation in 1859 was the Spofford brace, featuring a split-socket chuck with thumbscrew.

But, topping them all was the invention of the shell-type chuck with adjustable jaws on an all-iron brace. Named the Barber brace, it was first manufactured in 1865 and soon dominated the market.

Written with Philip Whitby
Photograph: Hopkins Associates
Illustration: Jim Stevenson

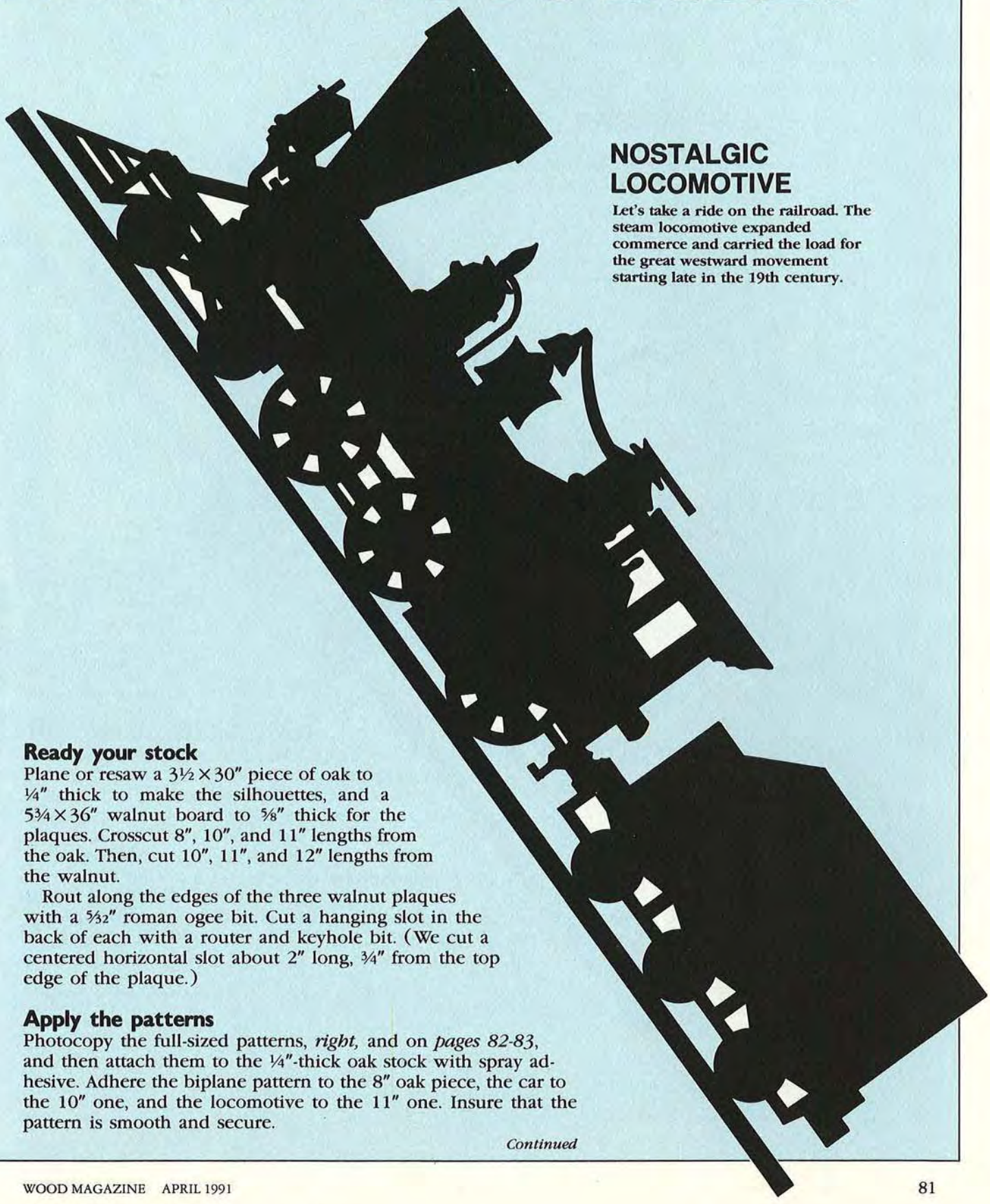
TRAINS, PLANES,

3 great scrollsaw patterns

Capture the spirit of America on the move with these stylish silhouettes from the past. They're just right for your den or office.

Print this article

& AUTOMOBILES



NOSTALGIC LOCOMOTIVE

Let's take a ride on the railroad. The steam locomotive expanded commerce and carried the load for the great westward movement starting late in the 19th century.

Ready your stock

Plane or resaw a 3½ × 30″ piece of oak to ¼″ thick to make the silhouettes, and a 5¾ × 36″ walnut board to ⅝″ thick for the plaques. Crosscut 8″, 10″, and 11″ lengths from the oak. Then, cut 10″, 11″, and 12″ lengths from the walnut.

Rout along the edges of the three walnut plaques with a 5/32″ roman ogee bit. Cut a hanging slot in the back of each with a router and keyhole bit. (We cut a centered horizontal slot about 2″ long, ¾″ from the top edge of the plaque.)

Apply the patterns

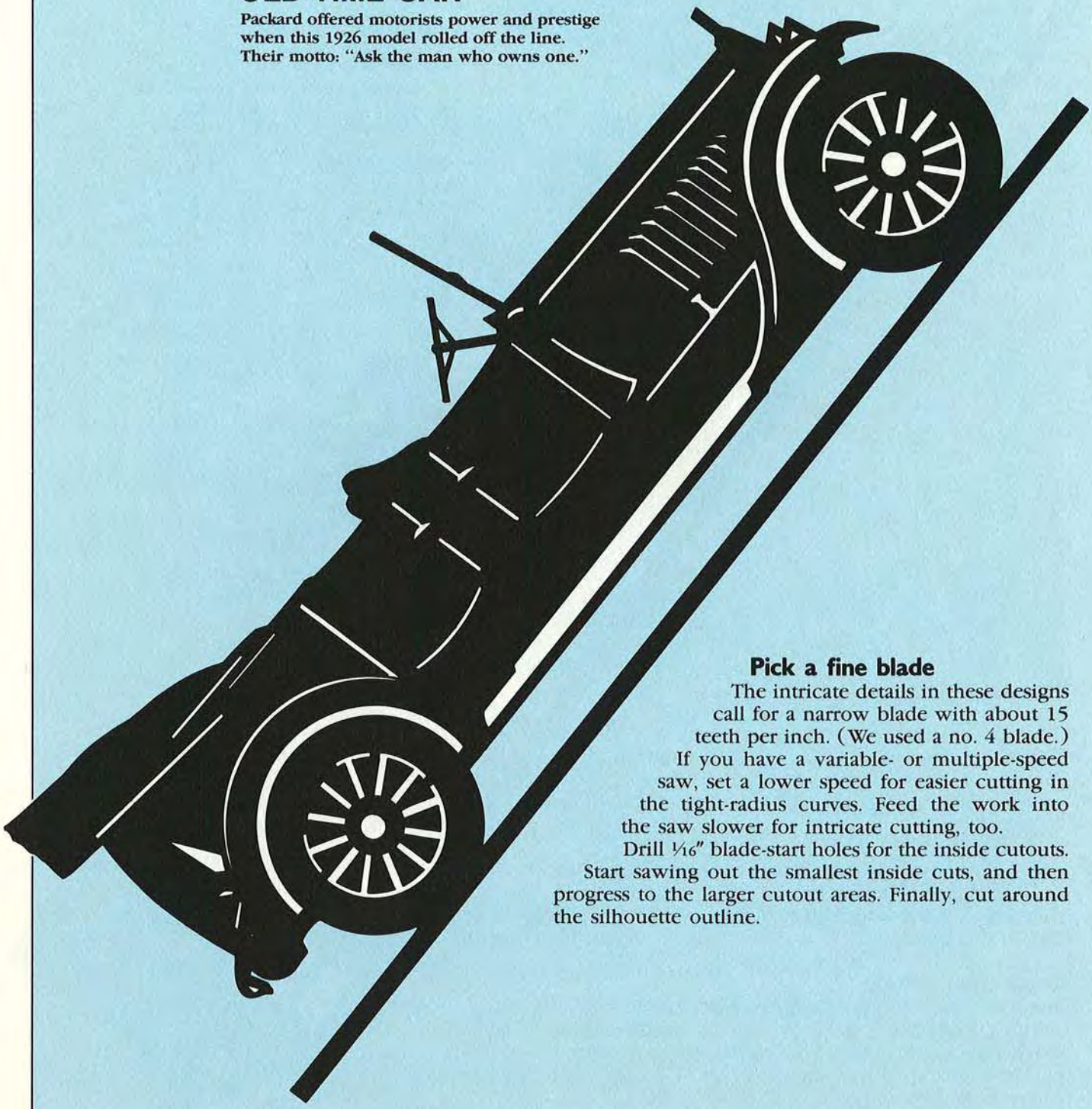
Photocopy the full-sized patterns, *right,* and on *pages 82-83,* and then attach them to the ¼″-thick oak stock with spray adhesive. Adhere the biplane pattern to the 8″ oak piece, the car to the 10″ one, and the locomotive to the 11″ one. Insure that the pattern is smooth and secure.

Continued

TRAINS, PLANES, & AUTOMOBILES

OLD-TIME CAR

Packard offered motorists power and prestige when this 1926 model rolled off the line. Their motto: "Ask the man who owns one."



Pick a fine blade

The intricate details in these designs call for a narrow blade with about 15 teeth per inch. (We used a no. 4 blade.) If you have a variable- or multiple-speed saw, set a lower speed for easier cutting in the tight-radius curves. Feed the work into the saw slower for intricate cutting, too.

Drill 1/16" blade-start holes for the inside cutouts. Start sawing out the smallest inside cuts, and then progress to the larger cutout areas. Finally, cut around the silhouette outline.

EARLY BIRD

The Wright brothers started it all with a biplane, and two wings were the standard for almost four decades of flight.

Put them on plaques

With the cutting completed, carefully remove the paper patterns and sand the silhouettes as needed. Be careful when sanding thin sections such as the car's windshield. Sand the walnut plaques.

Center the locomotive cutout on the 12"-long plaque, mark the location, then apply woodworker's glue sparingly to the back of the silhouette. Clamp it to the plaque with handscrew clamps. Center and attach the automobile to the 11" plaque, and the airplane to the 10" one. When the glue has set, apply a clear oil finish.

Pattern design: Elaine Hutcheson, Paper Cut Art, Virginia Beach, Va.
Photograph: Hopkins Associates
Illustrations: Mike Henry

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TOOL-INDUSTRY INSIDER

COMING RIGHT UP

SHORTER CHARGING FOR CORDLESS TOOLS

Already, companies here in the United States and abroad offer the new 15-minute charging system. Ten- and 5-minute systems aren't far behind.

If there's one thing that frustrates owners of cordless power tools, it's having to wait—often an hour or more—for recharging. Fear not, help has arrived!

While researching the battery-powered drills article for this issue (see page 62), we talked to several manufacturers who said to expect charging times to come way down. In fact, Panasonic and Ryobi already have 15-minute charging systems for sale in the U.S. market. And, according to Doug Bock of Panasonic, other manufacturers will soon join the club. "Several other companies, including Bosch, Makita, and Hitachi, have 15-minute chargers in overseas markets. It won't be long before we see those here."

Many innovative tools make a later debut in the U.S. because most manufacturers work to list their tools with Underwriters Laboratory. Often, this listing requires the company to make time-consuming modifications.

We also learned that Metabo introduced a 10-minute charger in January that accepts batteries from older-model Metabo cordless products (Panasonic's system requires 15-minute batteries and chargers). Steve Jost of Metabo tells us the new "cold charger" will triple the life span of batteries from 1,000 cycles (a complete discharge and recharge) to 3,000 cycles. How? Metabo's charger eliminates life-shortening heat during charging.

What's next? "We're working on a five-minute charging system. It's not far away," Panasonic's Bock added. This new technology, wonderful though it is, doesn't come cheap. For example, Panasonic's 15-minute system adds $40-$50 to the cost of the same drills with 60-minute chargers and batteries.

What does all this mean to you? Plenty, if you're the type who values quality time spent in the shop, or on the job, with cordless tools. The time you save may very well overshadow the added expense. And if you decide to hold off for now, you may find this technology becoming more affordable in the coming years.

Illustration: Jim Stevenson

PLANS

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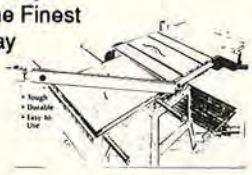

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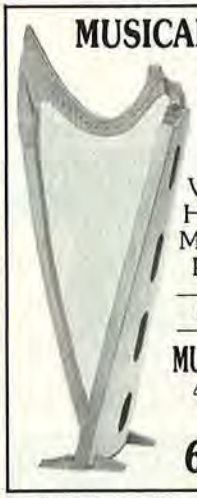

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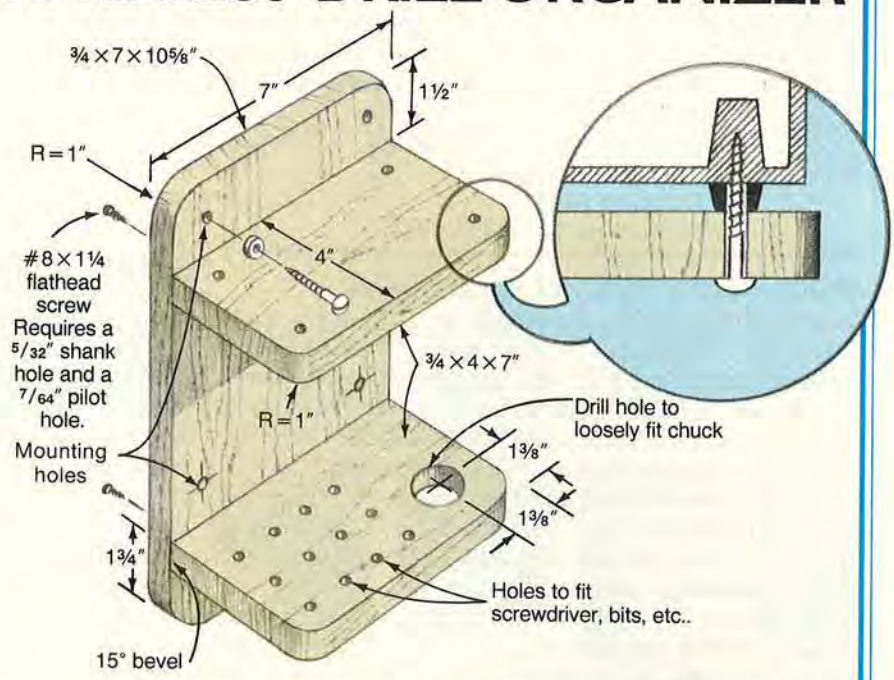

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Marlen Kemmet

How-to Editor

Photograph: Hopkins Associates Illustration: Jim Stevenson

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ASK WOOD

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When your shop's not on the level

I love your projects, especially the stationary tools and tables. I'm in the process now of building your workbench featured in the September 1990 issue. I'm already anticipating the same problem that I have with my home-built tools and other stationary benches and tables—that is, they are not stationary.

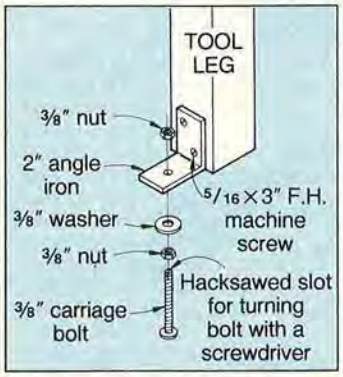
Probably few of your readers enjoy the luxury of a perfectly flat or level workshop floor. My shop is in the basement, which means that because of a leaky wall, I sometimes get standing water.

Of course, I've tried shims, galvanized pipes, and flanges, all with marginal success. Can someone please come up with an adjustable, high-and-dry idea for making stationary power tools and benches live up to their name?

— Edward Mischnick, Detroit, Mich.

Ed, yours is indeed a familiar problem to many of our readers, particularly, those who have cracked and uneven basement or garage workshop floors. Besides shimming, we have two remedies for dealing with the "rockies"—that annoying and sometimes dangerous condition that causes tools and benches to wobble when in use.

The first and least expensive way involves cutting 2"- to 3"-long pieces of 2" angle iron, drilling holes in them for the needed hardware, and bolting them to the legs or corners of tools and benches where shown, right. *Note here that you can adjust a corner's height by turning the slotted shaft of the carriage-head bolt with a screwdriver. You'll need to cut that slot with a hacksaw.*



A second method in the case of stationary power tools is to purchase and attach adjustable machine bases. These come with wheels and locking mechanisms, allowing you to roll your tool out when you need it, and then push it alongside a wall when you're through. Two manufacturers make these: HTC Products, Inc. and Delta.

Turned wood that's safe for food

I am retired and work with wood as a hobby. I make bowls and other items as gifts. Could you tell me if there is a list of woods that I can safely use in bowls, goblets, and other containers for food?

— Ralph Easley, Cincinnati, Ohio

Ralph, you really can't go wrong with dense, tight-grained American hardwoods such as maple and cherry. But keep in mind that the application of a safe sealing finish ranks as equally important. Leading woodturner Dale Nish says in his book Creative Woodturning *that "Kitchenware or other turnings used in contact with foods must have nontoxic finishes." As it turns out, practically all finishes—once fully cured—pose no threat to human health. With our kitchenware turnings, we frequently recommend Behlen's Salad Bowl Finish. This nontoxic product comes with a clean bill of health from the FDA. For one pint, #85006, send $9 ppd. to Armor Products, Box 445, East Northport, NY 11731. (Orders from Canada, $11.) Or you can call 516/462-6228.*

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My questions are: Can I make and sell these boxes from the plans you've published without causing problems with your magazine or Mr. Mikutowski? And, are there any copyright restrictions preventing me from following through with a distributor?

— Doug Harris, Grand Rapids, Mich.

Doug, it delights us that you've received such high praise for the business-card boxes. Any business person would welcome such an item for a gift. Regarding the mass manufacture and distribution of these boxes for profit, we need to inform you of our policy.

Because this project was designed by an outside designer (someone not on our staff), you will need to negotiate your business interest with him. In a separate letter, we already have sent you Michael Mikutowski's address.

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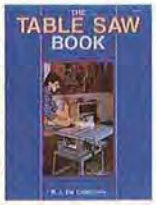

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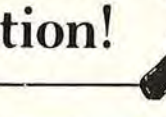

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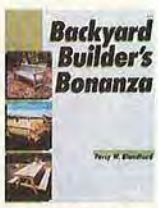

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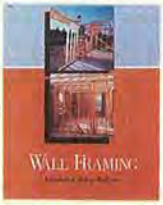

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23-880	8" bench grinder 1/2 HP	136	115
11-950	8" drill press	164	139
14-040	14" drill press	313	309
40-150	15" hobby scroll saw	178	139
28-160	10" hobby band saw	189	144
31-050	1" belt sander 2.0 amp	93	78
31-460	4" belt/disc sander	178	139
31-340	NEW1" belt/8 disc sander	226	175

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23-580	5" Bench grinder 1/5 HP	60	54
11-990	12" Bench Drill Press	266	185
11-090	32"Radial bench drill press	399	279
43-355	3/4" Shaper 1 1/2 h.p.	950	685
43-505	1/2"Bench router/shaper	399	279

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33-990	10" radial arm saw	727	565
37-280	6" motorized jointer	440	375
50-179	3/4 HP 2 stg. dust coll.	435	339
50-180	1 HP dust collector	535	415
50-181	2 HP dust collector	760	599
22-667	13" planer w/2 HP motor w/stand & ext. wings	1750	1099
33-050	NEW 8-1/4 Sawbuck	742	545
33-055	Above saw comp w/legs	865	565
34-330	NEW 8-1/4" Tbl Saw 13A	321	195
34-985	1/6 HP stock feeder	698	459
32-100	NEW station plate jointer	645	279
36-040	NEW 8-1/4 cmpd mitre saw	216	159
34-897	50" Delta unifence	500	338
36-755	NEW 10" Tilt Arbor Saw	1203	875

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6527	NEW SawZall v/spd 8 amp w/case & Quick Loc Cord	299	165
0399-1	NEW12V cdlss var/spd drill w/batt. charger & case	290	155
0395-1	9.6V cdlss. drill w/case	270	148
0219-1	9.6V cdlss. drill w/case	295	165
0224-1	3/8" drill 4.5A magnum	189	112
0234-1	1/2" drill 4.5Amag0-850rpm	209	112
0244-1	1/2" drill 4.5Amag0-600rpm	209	112
0222-1	3/8" drill 3.5A 0-1000 rpm	179	102
0228-1	3/8" drill 3.5A 0-1000 rpm	169	99
0375-1	3/8" close quarter drill	206	125
0379-1	1/2" close quarter drill	243	154
6539-1	Cdls. scrdrv. 190 rpm	119	69
6540-1	Cdls. scrdrv. w/bits & cse	159	108
6546-1	Cdls. scrdrv. 200 & 400 rpm	126	75
3102-1	Plmbrs rt angle drill kit	330	185
5399	1/2" D-hdle ham drill kit	312	179
1676-1	H.D. Hole Hawg w/case	429	229
6511	2 sp SawZall w/case	224	129
6750-1	Drywall gun 0-4000 4.5A	154	89
6507	TSC SawZall w/case	239	129
6170	14" chop saw	430	259
6014	Orbital sander 1/2 sheet	209	118
6977	Var. temp heat gun	114	75
5397-1	3.8" v/sp ham. drill kit	232	137
5371-1	1/2" v/sp ham. drill kit	335	185
3107-1	1/2" v/sp rt angle drill kit	340	189
6754-1	Drywall gun 0-4000 4.5A	179	119
3300-1	1/2" v/sp mag rt angle drill	309	179
5660	Router 1-1/2 HP - 10amp	325	195
5680	Router 2 HP - 12 Amp	355	219
5455	7/8" polisher 1750 rpm	219	127
6215	16" chain saw	280	169
6365	7-1/4" circular saw	204	119
6366	7-1/4" circ. saw w/fnc & bld	214	125
6368	7-1/4" circ. saw w/fence blade & case	239	135
0235-1	1/2" drill kyls. chuck mag	215	125
6016	1/4 sheet pad sander	84	49
6145	4.5" grinder 10,000 rpm	159	95
6142	6145 w/case & access	197	125
6749-1	Drywall gun 0-2500 4.5A	189	125
6377	7-1/4" worm drive saw	295	169

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CARBIDE TIPPED SAW BLADES

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LU82M010	Cut-off 10"	60	77	44
LU84M011	Comb 10"	50	65	39
LU85M010	Super Cut-off10"	80	96	55
LM72M010	Ripping 10"	24	57	37
LU73M010	Cut off 10"	60	70	44
LU87M010	Thin kerf 10"	24	60	38
LU88M010	Thin kerf 10	60	74	44
LU96M010	Ultimate 10"	80	107	68
SD306	6" Dado - Carbide		184	105
SD308	8" Dado - Carbide		196	109
F0	1-3/4" x 5/8" Bisc. 1000 Qty.		32	27
F10	2-1/8" x 3/4" Bisc. 1000 Qty.		32	27
F20	2-3/4" x 1" Bisc.1000 Qty.		34	29
FA	Assor. Biscuits 1000 Qty.		34	29
WC106	6 pc. chisel set w/cse 1/4"-1"		73	52
FB100	16 piece forstner bit set		284	159
94-100	5 pc. router bit door system		288	155
JS100	Biscuit Jointer w/case		300	159
CE82	Planer w/case & carb blds		218	135
FT2000	3-1/4 HP plunge router		299	179

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TK206	10" Framing	24	33	19.80
TK303	7-1/4" Finishing	40	36	21.60
TK306	10" Finishing	40	40	23.95
TK903	7-1/4" Combo	30	31	18.60
TK906	10" Combo	50	45	26.95

MAKITA CORDLESS

Model		List	Sale
6070DW	3/8" v/speed rev. drill, 7.2v	130	78
6071DWK	3/6" v/speed rev. drill w/removable batt, 7.2v	199	115
5090DW	3-3/8" saw kit. 9.6v	256	139
6010DWK	3/8" cdls drill kit 7.2v	164	95
6010SDW	3/8" cdls. drill kit, 7.2v	99	59
DA3000DW	3/8" angle drill, 7.2v	251	139
8400DW	Hammer drill kit, 9.6v	272	149
4390DW	9.6 cdls recip saw kit	230	128
6012HDW	2 spd. driver drill w/clutch & case 9.6	236	122
6092DW	V/sp drill, kit complete	250	125
6093DW	V/sp drill w/clutch-complete	261	127
632007-4	9.6 volt battery	48	30
632002-4	7.2 volt battery	40	28
5007NBA	7-1/4" saw w/elec. brake	233	124
5008NBA	8-1/4" saw w/elec. brake	284	158
B04510	1/4 sheet pad sander	85	54
9900B	3" x 21" belt sander w/bag	268	144
9924DB	3"x 24" belt sander w/bag	282	145
9045N	1/2 sht fin. sand. w/bag	231	129
4200N	4-3/8" circ. saw 7.4A	225	127
4301BV	Orb. v/sp jig saw 3.5A	289	155
JR3000V	Vs. recip saw w/cse	227	124
LS1020	10" miter saw 3.5A	463	289
9820-2	Blade sharpener	373	195
1900BW	3-3/4" planer w/case	209	114
1911B	4-3/8" circ. saw 7.5A	240	139
1100	3-1/4" planer w/case	401	205
9207SPC	7" sander-polisher	276	149
3601B	1-3/8 HP router	255	139
9501BZ	4" grinder, 3.5 amp	126	69
B04530	6" round sander	101	64
B04550	1/4 sht pad sander w/bag	86	58
DA3000R	3/8"angle drill	270	148
HP2010N	3/4" v/sp hmr. drill w/case	300	165
2708W	8-1/4" table saw	504	249
2711	10" table saw w/brake	841	479
2030N	12" planer/jointer	3120	1665
2040	15-5/8" planer	2595	1459
1805B	6-1/8" planer kit w/case	679	359
5005BA	5-1/2" circular saw	223	135
6404	3/8" drill rev. 0-2100 rpm 2A	104	65
6510LVR	3/8" drill rev. 0-1050 rpm	145	79
6013BR	1/2" drill rev. 6 Amp	241	135
5402A	16" circular saw-12 amp	636	325
3612BR	3 HP plunge router	377	189
9401	4" x 24" belt sander w/bag	318	165
4302C	V spd. orb. jig saw	302	159
5077B	7-1/4" Hypoid saw	252	138
LS1440	14" Miter saw	721	435
LS1030	NEW 10" Mitre saw	414	225
5007NB	7-1/4" circ saw 13A	209	112
3612B	3 HP plunge router sq/base	377	189

SENCO AIR NAILERS

Model		List	Sale
SFN1	Finishing nailer 1"- 2"	377	275
SFN2	Fin. nailer 1.5" - 2.5"	571	395
SN325	Nailer 1-7/8" - 3-1/4"	665	455
SN4	Gen'l purpose 2" - 3-1/2"	685	475
LS2	Pinner 5/8" - 1	351	255
SKS	Stapler 5/8" - 1-1/2"	351	255
LS6	Pinner 1" - 1-1/2	399	285

BOSTICH AIR NAILERS

Model		List	Sale
N80C-1	Utility coil nailer	845	429
N80S-1	Stick nailer	845	429
T36-50	Sheatth & decking stapler	595	334
N12B-1	Coil roofing nailer	845	429
N60FN-2	Finishing nailer	625	345
T31	Brad nailer	270	155
CWC100	1 HP Pancake Compressor	445	299

SKIL SIZZLERS

6850-02	NEW 1/2" EMH hammer drill w/case 4 amp	255	129
3810	10" Miter saw	263	209
3810K	3810 w/60 tooth carb blade		235
77	7-1/4" worm drive saw	230	144
2735-04	12 v v/spd cordless drill,w/cse,2 batt & xtra special 5 piece bit set	210	129
1605	NEW Biscuit Jointer w/cse	200	119

PANASONIC CORDLESS

EY6205B	NEW v/spd. 12 volt drill w/15 minute charger	390	179
EY6005B	12v cdls drill w/1 hr chgr	315	169
EY6200B	NEW 2 spd. 12 volt drill d-handle w/15 minute charger	350	185
EY6281B	NEW v/spd. 9.6 volt drill w/15 minute charger	350	169
EY571B	V/spd 9.6 volt drill kit	239	128

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MMT	24" multiple mort. & tenon attachment for D1258-24	299	169

HITACHI TOOLS

Model		List	Sale
C7BD	7 1/4" circular saw	230	129
M12V	NEW 3 HP v/sp router	437	235
TR12	Plunge router. 3 HP	354	169
F1000A	12" Planer/6"jointer	2835	1505
P100F	12" Planer	2005	1259
C10FA	10" deluxe mitre saw	490	269
C12FA	NEW 12" mitre saw	586	319
C8FB	8-1/2" slide cmpd saw	859	445
FREUD	LU91M008 8-1/2" c/bld 48 tooth	58	36
C15FB	15" miter saw	745	379
FREUD	LU85M015 15"c/bld 108 tooth	181	115

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34-444 Table Saw Complete w/1-1/2 H.P. motor & stand 605.00

34-445-34-444 Table Saw complete w/30" Unifence 779.00

37-154 DJ15 6" Jointer w/3/4 H.P. motor 999.00

28-283 14" Band Saw w/enclosed stand 3/4 H.P. motor 675.00

70-200 NEW 20" Drill Press 729.00

17-900 15-1/2" Floor Drill Press 385.00

40-601 18" Scroll Saw w/stand and blades 689.00

DELTA #34-080 10" MITRE BOX XTRA SPECIAL 195.00 List 289.00

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PIRANHA By Black & Decker CARBIDE TOOTH SAW

Model #	Dia.	Teeth	List	Sale
73-716	6-1/2	18	13.70	7.35
73-717	7-1/4	18	13.90	7.99
73-737	7-1/4	24	17.20	9.29
73-757	7-1/4	40	31.30	16.79
73-759	8-1/4	40	44.65	24.99
73-719	8-1/4	22	19.65	11.95
73-715	5-1/2	16	13.70	7.99
73-740	10	32	32.98	15.95
73-770	10	60	67.02	29.95
73-711	10	50	65.08	29.95

PORTA NAILER

401	porta nailer complete	265	189
501	face nailer complete	265	189

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WINTER KIT SPECIALS

6093DWH	Makita cdls v/sp drill kit w/clutch & brake. Includes extra battery & holster	313	165
9850K	Porter Cable cdls var/spd drill kit Includes extra battery	288	165
7334K	Porter Cable 5" random orbit sander w/case & 1 roll 100X & 150X discs	253	149
7335K	Porter Cable 5" v/spd random orb sander w/case & 1 roll 100X & 150X discs	273	159
7336K	Porter Cable 6" v/sp rand orb sander w/case & 1 roll 100X & 150X discs	278	165
555K	Porter Cable plate biscuit jointer w/case & 1000 assort. biscuits	339	189
JS100K	Freud plate biscuit jointer w/case & 1000 assort. biscuits	351	184
1581VSK	Bosch top hdle jig saw with case & 30 Bosch blades	305	185
1582VSK	Bosch CLIC barrell grip jig saw w/case & 30 Bosch blades	305	185

BIESMEYER FENCES

B-50	50" commer. saw fence	329	299
T-SQUARE 52	52" homeshop fence	249	239

WEDGE SMART LEVEL

Model	Description	List	Sale
SM-TR2	2 FT level w/sensor	120	108
SM-TR4	4 FT level w/sensor	150	135
SM-TR6	6 FT level w/sensor	180	162

JORGENSEN I-BAR CLAMPS

Model	Size	List	Sale
7224	24"	27.11	17.55
7236	36"	29.10	18.65
7248	48"	31.96	19.75
7260	60"	35.60	23.55
7272	72"	37.30	25.29

ADJUSTABLE HANDSCREWS BY JORGENSEN

Item#	Jaw Length	Open Cap	List	Sale	Box of 6
#3/0	6"	3"	15.57	8.89	49.98
#2/0	7"	3-1/2"	16.74	9.95	53.55
#0	8"	4-1/2"	18.63	11.95	62.95
#1	10"	6"	21.30	12.99	71.49
#2	12"	8-1/2"	24.45	15.95	81.89
#3	14"	10"	31.01	18.95	104.95
#4	16"	12"	40.30	24.89	146.85

STYLE 37 2-1/2"Throat 1/4" x 3/4" JORGENSEN

Item#	Jaw Length	List	Sale	Box of 6
3706	6"	9.30	6.29	35.65
3712	12"	10.30	6.79	38.59
3718	18"	11.37	7.35	41.69
3724	24"	12.42	7.99	45.25
3730	30"	13.85	9.05	51.19
3736	36"	15.15	9.95	56.65

PONY CLAMP FIXTURES

Model		List	Sale	Lots of 12
503/4"	black pipe clamps	13.10	7.89	83.99
521/2"	black pipe clamps	10.93	6.30	68.25

BOSCH

Model		List	Sale
1581VS	Top handle jig saw	239	133
1582VSC	NEW CLIC Barrell jig saw	245	133
	Bosch metal case for above jig saws	34	30
	Bosch blade assortment for jig saws 30 of Bosch's best selling blades	25.99	
1942	Heat gun 600° - 900°	99	65
1272D	3" x 24" belt sander w/bag	299	169
1273D	4" x 24" belt sander w/bag	315	178
1290D	1/2 sheet sander w/bag	209	115
11-212VSR	Bulldog 3/4"SDS rtry drill	339	194
1198VSR	1/2" v/sp hammer drill	229	133
1608	5.6A laminate trimmer	140	87
1608L	Same/above w/trim guide	145	92
1609	5.6A offset base trimmer	205	115
1609K	Lam installers kit w/1609	295	169
1601	1 HP Router	165	105
1602	1-1/2 HP Router	199	125
1603	1/2 HP D hdle. router	223	139
1604	1-3/4 HP 2 hdle. router	219	118
1604K	Same as above w/cs & acc	269	165
1606	1-3/4 HP D hdle. router	243	145
3258	3-1/4" planer w/bldg guard	210	118
3270D	3" x 21" belt sand. w/bag	225	135
1273DVS	V/sp 4x24 belt sander	339	189
1611	3 HP plunge router	349	198
1611EVS	3 HP V/speed router	410	229
1651	7-1/4" circ. saw drop foot	179	109
1654	7-1/4" circ. saw pivot base	179	109
1632VSRK	Recip saw 8.4A orb-v/sp	225	135
3050VSRK	9.6v cdls v/spd drill kit comp	235	135
1370DEVS	6" heavy duty random sndr	369	225
3283DVS	5" random orbit sander	159	95

ELU BY BLACK & DECKER

Model		List	Sale
3338	2.25 HP v/spd plunge router	387	249
3304	1 HP v/spd plunge router	261	178
3375	3-1/8" univ. planer 7.2A	280	159
3380	Biscuit jointer w/case	485	245
4024	3 x 21 v/spd belt sander	289	188
3303	1 HP plunge router	210	159

BLACK & DECKER

Model		List	Sale
1166	3/8" Drill 0-2500 rpm 4A	96	59
2600	3/8" drill 0-1200 rpm 4.5A	125	85
1707	8.5" crosscut miter saw	813	445
1703	10" miter saw w/73-770 bld	313	179
2694	NEW 7 1/4 super sawcat	242	159
2695	NEW 8 1/4 super sawcat	265	175
4011	1/4 sheet palm sander	82	62

JET TOOLS

Model	Description	List	Sale
JBS-14MW	14" band saw 1 HP	482	375
JTS-10	10" tbl saw w/std 1-1/2 HP	554	449
JTS-12	12" tbl saw w/std 1-1/2 HP	630	499
JWS-18	1/2 sharper w/std 1 HP	479	365
DC610	1 H.P. dust collector	321	245
DC1182	2 H.P. dust collector	577	415
DC1883	3 H.P. dust collector	850	639
JJ-4	4" jointer, 1/2 HP	310	275
JJ-6	6" jointer, 3/4 HP	465	365
JWP12	12-1/2" bench plnr 2 HP	569	365
JWP12D	Dust chute for JWP12	45	22
JSG-6	6 x 48 belt & 12" disc sander, 1-1/2 HP	634	465
JDP10	NEW 10" bench drill press	209	165
JDP14M	NEW 14" bench drill press	339	285
JDP17M	NEW 16 1/2" bench drill press	399	365
JDP14MF	NEW 14" floor drill press	419	349
JDP17MF	NEW 16 1/2" floor drill press	459	379
JDP20MF	NEW 20 1/2" floor drill press	819	645

RYOBI SPECIALS

Model		List	Sale
R500	2-1/4 HP plunge router	326	155
TS25IU	10" miter saw	392	179
TS25IUS	10" miter w/acc. kit & B&D 73-770 carb blade	435	225
AP10	10" surface planer 13A	820	358
RA200	8-1/4" radial arm saw	515	245
RE600	3 HP plunge router	398	205
BE424	NEW 4X24 var spd belt sndr	340	175
BE321	3 x 21" v/sp belt sander	259	129
SC160	NEW 16" bench scroll saw	260	145
TFD170VRK	9.6V cdlss drill kit	254	159
TFD220VRK	12V cdlss drill kit	279	169
JM100K	NEW Biscuit jointer w/cse	430	215

PORTER CABLE

Model		List	Sale
690	1-1/2 HP router 8A	225	124
691	1-1/2 HP router D hdle	245	135
518	3 HP 5 speed router	560	335
520	3 HP 15A router	510	315
695	1-1/2 HP router/shaper	310	198
696	H.D. shaper table	170	115
351	3" x 21" belt sand w/o bag	225	128
352	3" x 21" belt sand w/bag	235	129
360	3" x 24" belt sand w/bag	310	174
361	3" x 24" belt sand w/o bag	290	168
362	4" x 24" belt sand w/bag	325	184
363	4" x 24" belt sand w/o bag	310	179
315-1	7-1/4" lop hdle circ saw	195	115
9315-1	315-1 comp. w/cs & carb bld.	225	129
617	7-1/4" pushhandle saw	195	115
9617	617 comp. w/cs & carb bld	225	129
314	4-1/2" Trim saw	215	125
9548	X HD bayonet saw w/case	290	195
9629	Recip saw v/speed 8A	235	139
9627	Recip saw 2 speed 8A	225	128
666	3/8" HD vsp drill 0-1200 rpm	185	122
621	3/8" HD vsp drill 0-1000 rpm	155	95
320	Abrasive plane 3 Amp	160	109
9118	Porta plane kit 7 Amp	335	189
7545	0-2500 drywall gun 5.2A	169	104
505	1/2 sheet pad sander	195	112
7511	3/8" v/sp drill 5.2 Amp	185	109
7514	1/2" v/sp drill 0-750 rpm	195	117
7548	Top hdl jig saw 4.8A	230	129
7648	Barrel grip jig saw 4.8A	225	145
330	Speed block sander 1/4 sht	97	55
555	Plate biscuit jointer w/case	299	165
345	6" saw boss 9 Amp	170	99
9345	345 comp. w/cs & carb bld	220	129
100	7/8 H.P. router	165	98
5116	Omni-Jig	395	265
9647	TIGER CUB recip saw	195	119
9850	12v cordless drill w/cse	230	135
8500	Extra 12v battery	48	35
9637	NEW Tools By Porter Cable! Full v/sp recip saw 8 A	240	135
7519	3-1/4 HP Router 2 Handle	399	235
7538	3-1/4 HP Pinge Router 2 Hdl.	399	235
7536	2-1/2 HP 2 Hdle Router	355	205
7537	2-1/2 HP "D" Hdle Router	375	219
7538	3-1/4 HP plunge router	399	235
7399	5.6A drywall cutout unit	120	75
7310	5.6A laminate trimmer	145	89
7312	5.6A offset base lam trim	209	119
7319	5.6A tilt base lam trimmer	165	105
97310	Lam Trim Kit w/std. Base, Tilt Base, Offset Base, Slitter Base, Guide & Cs	330	185
7334	5" random orbit sander	205	119
7335	5" Var Speed 2500-6000 rpm Random Orbit Sander	225	129
7336	6" Var Speed 2500-6000 rpm Random Orbit Sander	225	134
693	1-1/2 H.P. plunge router base	280	165
6931	Plunge router base	120	75
9505	**505 Commemorative Edition**		
	1/2 sheet pad sander w/oak case		139

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FINISHING TOUCHES

AN ARTIST'S BURNING DESIRE

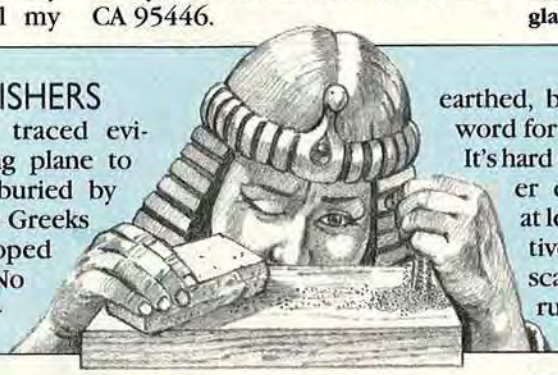
Daniel Leahy depends on California sunshine. No, he doesn't grow oranges or sell suntan lotion. Leahy creates pictures, laser-style. The woodworking artist accidentally discovered what he calls solar etching a few years back when he wandered outdoors with an 8" spot-projector lens he'd been using as a paperweight. While holding it in the sunlight near a piece of wood, a flame shot up almost instantaneously. "It took less than a second," Leahy remembers. Intrigued, he began burning lines on the wood, and a new career was born. "My solar etchings now outsell my custom-made furniture," says the 41-year-old Guerneville craftsman. In fact, Leahy's etching on display in the San Jose Public Library has a price tag of $10,000. Burned on a 7x18' panel of glued-up 2x4s, it depicts the city in the late 1800s. Normally, his work runs from 12" diameter and up and sells for $75 to $1000. To learn more about solar etching, write for a copy of Leahy's 24-page, how-to booklet, "Solar Art." Send $5 (U.S.) ppd. to: Daniel Leahy, P.O. Box 2154, Guerneville, CA 95446.

Solar artist Daniel Leahy uses a magnifying lens to burn intricate patterns into the different woods he's laid up. Dark glasses protect his eyes.

THE PHARAOH'S FINISHERS

Although historians have traced evidence of the woodworking plane to Pompei, the Roman city buried by volcanic lava in 79 A.D., the Greeks may have actually developed and used the tool first. No Greek planes have been unearthed, but the ancient Greeks had a word for it—rhykane.

It's hard to imagine how any woodworker could smooth wood without at least a hand plane, but the inventive Egyptians found a way. They scattered sand on wood, then rubbed it with stone blocks.



TREES: NATURE'S AIR CONDITIONER & HUMIDIFIER

One acre of trees supplies 4 tons of oxygen a year—enough to support 18 people, while using about 2.6 tons of carbon dioxide. That same acre, according to Doug Powell, a U.S. Forest Service researcher, cleans about 13 tons of dust and gases annually from the surrounding environment. An acre of beech or maple trees can give off 8,000 gallons of water — that's transpiration—into the earth's atmosphere during a single growing season.

CHINA'S SORROW: A CLASSIC CASE OF LAND MISMANAGEMENT

"He who fails to plant a tree...shall go coffinless to the grave." — from the proclamation of Chinese Emperor Chin Shih Huang Ti ordering the replanting of the forests along the 2,500-mile long Yellow River about 200 B.C.

Some 2,000 years earlier, the vast forests had been ordered burned by Emperor Shun, who thought the land better suited to farming. Instead, the rich humus in the valley of the Yellow River became depleted, the river annually flooded, massive amounts of soil were carried off, and poverty eventually reigned. Despite Emperor Chin's order to replant, the feudal lords who owned the land refused to do so. Today, the Yellow River still spills over its banks, plaguing the valley with devastation and earning designation as China's Sorrow.

WAY OUT WEST, THE CALL IS "TIMBER!"

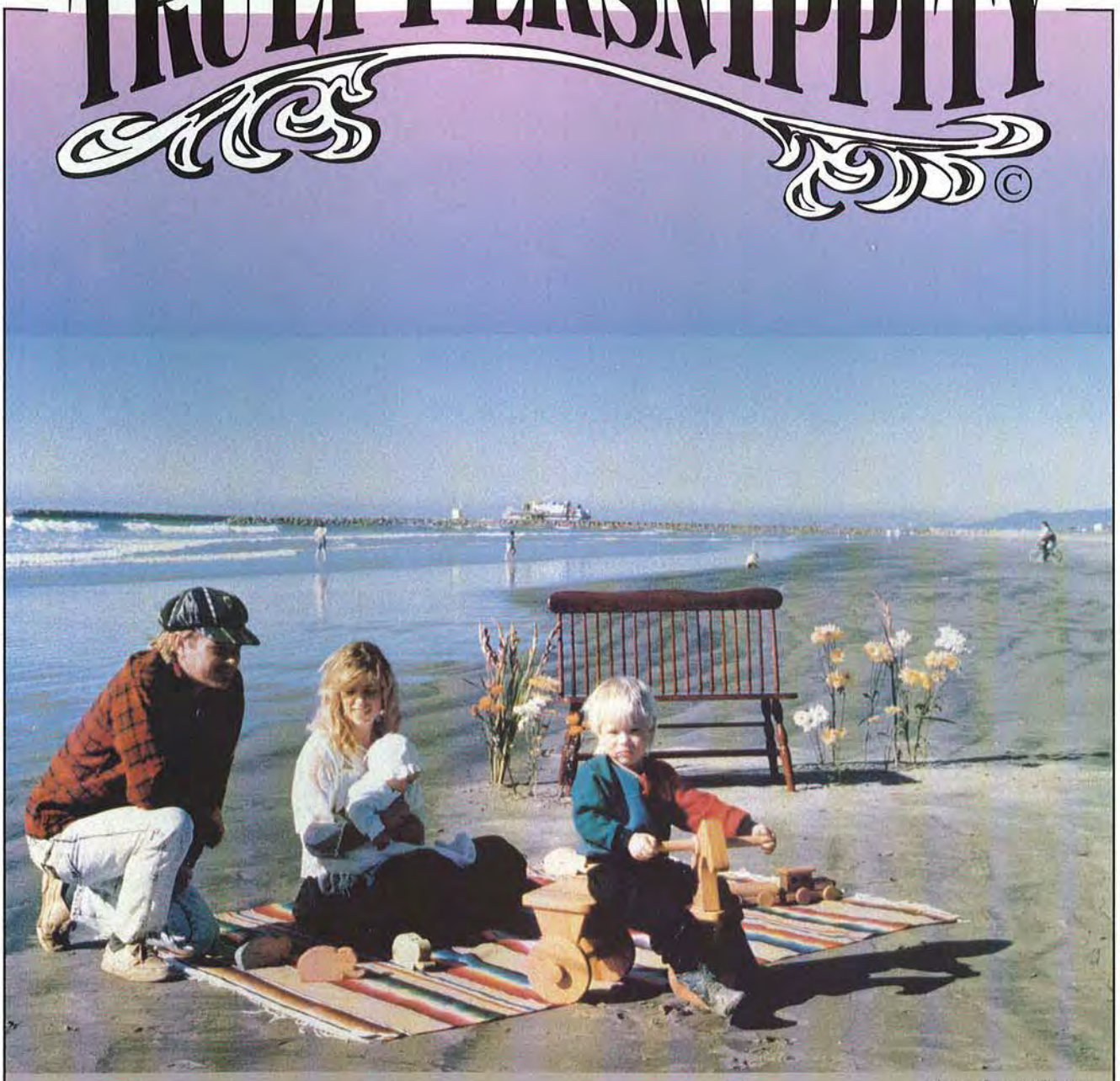
In 1989, the 11 contiguous western states plus South Dakota's Black Hills provided 56.4 percent of all softwood lumber produced in the U.S.

WHICH STATES HAVE THE MOST FOREST?

Based solely on the percentage of land covered by forests, the U.S. Forest Service rates Maine (89.8 percent), as the most forested state, followed by New Hampshire (88.1 percent), West Virginia (78.5 percent), Vermont (75.7 percent), and Alabama (66.9 percent). North Dakota (1 percent) is the least forested state, beating out Nebraska (1.5 percent) for the dubious honor. The country as a whole is nearly one-third forested (32 percent).

Illustrations: Jim Stevenson Photographs: Ben Margot, Daniel Leahy

TRULY PERSNIPPITY©



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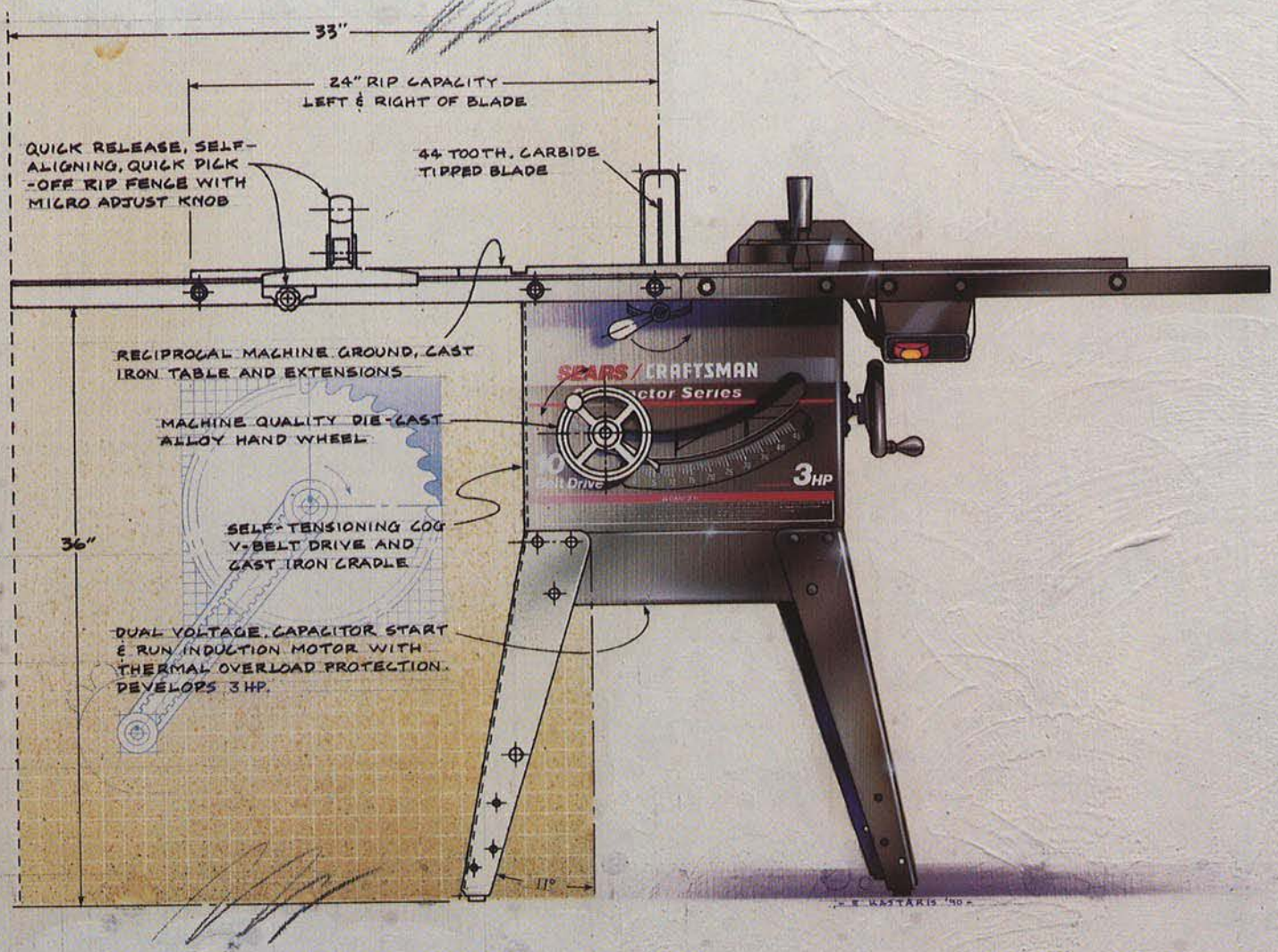
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24" RIP CAPACITY
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44 TOOTH, CARBIDE TIPPED BLADE
RECIPROCAL MACHINE GROUND, CAST IRON TABLE AND EXTENSIONS
MACHINE QUALITY DIE-CAST ALLOY HAND WHEEL
SELF-TENSIONING COG V-BELT DRIVE AND CAST IRON CRADLE
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11°
SEARS / CRAFTSMAN
3HP

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